

ADMINISTRATION REPORT
OF THE

PUBLIC WORKS DEPARTMENT,

(General, Buildings and Roads Branch).

MADRAS PRESIDENCY

For the year

1889 — 90.

1890.

செப்பிடுபவர் பெயர்
செப்பிடுவதற்குக் கருத்துக்
கொள்ளப்பட்ட நாள்
1889.1893.
செப்பிடுவதற்குக் கருத்துக்
கொள்ளப்பட்ட நாள்
1889.1893.
செப்பிடுவதற்குக் கருத்துக்
கொள்ளப்பட்ட நாள்
1889.1893.
செப்பிடுவதற்குக் கருத்துக்
கொள்ளப்பட்ட நாள்
1889.1893.

R
DI. 211 v m 24
m 24, 1

3644c

SECRETARIAT LIBRARY,
MADRAS.

Class *I* No. 320

Book-case 13



ADMINISTRATION REPORT

OF THE

PUBLIC WORKS DEPARTMENT,

(GENERAL, BUILDINGS AND ROADS BRANCH,)

MADRAS PRESIDENCY

FOR THE YEAR

1889-90.

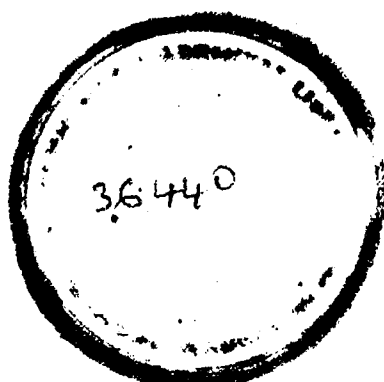
MADRAS:

PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRES

[Price, Re. 1-8-0.]

1890.

R.
 D. 2117 M89
 1942



ADMINISTRATION REPORT

OF THE

PUBLIC WORKS DEPARTMENT, MADRAS,

(GENERAL, BUILDINGS AND ROADS BRANCH).

FOR THE YEAR 1889-90.

I.—GENERAL REMARKS.

Administration.—The charge of the General, Buildings and Roads Branch continued in the hands of Lieutenant-Colonel R. R. E. Drake-Brockman, R.E., as Acting Chief Engineer and Joint Secretary to Government, while the Irrigation Branch continued to be administered by Mr. G. T. Walsh, M.R.C.E., as Chief Engineer and Acting Secretary. Colonel H. R. Mead, R.E., the permanent Chief Engineer for Irrigation, who had proceeded on furlough to Europe in March 1889, retired from the service on the 29th September 1889, and Mr. Walsh was confirmed in the appointment of Chief Engineer for Irrigation from that date, but continued to act as Secretary to Government, *vice* Colonel J. O. Hasted, R.E., on leave.

The Circle charges were as follows:—The I Circle, with head-quarters at Dowlaishweram, was held by Major D. McNeil Campbell, R.E., Superintending Engineer, temporary rank, from March to November 1889, when on transfer he was succeeded by Mr. J. D. Grant, Superintending Engineer, temporary rank. In March 1890, Mr. Grant proceeded to England on emergent medical certificate, and his place was taken by Mr. J. W. Martin, Superintending Engineer, temporary rank. The II Circle, head-quarters Bezvada, and the III Circle, head-quarters Bellary, continued throughout the year under the administration of Mr. J. Hannan, Superintending Engineer, sub. *pro tem.*, and Colonel H. Smalley, R.E., Superintending Engineer, sub. *pro tem.*, respectively. The IV Circle, head-quarters Coimbatore, was held by Lieutenant-Colonel A. C. Smith, R.E., Superintending Engineer, until 13th May 1889, when he was succeeded by Colonel H. M. Vibart, R.E., Superintending Engineer. The latter officer having proceeded on furlough in November 1889, the charge of the circle for the rest of the year devolved on Major D. McNeil Campbell, R.E., Superintending Engineer, temporary rank. The permanent charge of the V Circle, head-quarters Madras, was held throughout the year by Colonel W. H. Burton, R.E., Superintending Engineer. The VI Circle, head-quarters Trichinopoly, was administered by Mr. W. Hughes, B.A., Executive Engineer and Superintending Engineer, temporary rank, from March to May 1889, when Lieutenant-Colonel A. C. Smith, R.E., Superintending Engineer, assumed permanent charge. The office of Consulting Architect remained in the hands of Mr. J. W. Brasington, Executive

Engineer, until September 1889, when he retired from the service, and was succeeded by Mr. H. Irwin, C.I.E., who was transferred to the Madras Establishment from Rajputana, with the rank of Superintending Engineer.

2. *Grants and Expenditure.*—The following statement shows the grants and expenditure of the year under the different service heads:—

	Original grant.	Revised estimate.	Expenditure.
	RS.	RS.	RS.
Imperial Military Works	6,84,700	7,71,600	7,66,499
Do. Civil Works	21,100	32,500	28,430
Provincial Civil Works	23,00,000	22,83,000	22,70,211
Local Incorporated Funds	70,600	1,11,000	57,134
Do. Excluded Funds		37,549	36,046
Estate Works	2,56,348	1,16,161	1,11,352
Total	33,26,148	33,51,810	32,99,372

3. *Madras Harbour Works.*—The progress in the reconstruction of the Madras Harbour during the official year 1889-90 was most satisfactory, and the outturn of work, and length of bonded superstructure built at the north pier, was greater than any previous year's record at either arm.

The entrance question again came before the Trustees and caused some little delay, but after further correspondence the orders directing the temporary stoppage in construction were withdrawn and the works allowed to progress.

One of the important events of the year was the arrival of Sir Alexander Rendel, C.I.E., Consulting Engineer to the Secretary of State, on the 24th February 1890 to inspect and report upon the state and condition of the works. Sir Alexander Rendel thoroughly went into all details connected with the construction of the Madras Harbour, both past and future, and made his report accordingly, approving of all the plans and arrangements prepared for the completion of the works by the Trust's Engineer. By being on the spot, he settled many important points in connection with the pier head design, rubble base protection, alteration in the width of the entrance on account of currents, and requirements of new and improved machinery for the completion of the works, which would otherwise have taken months to decide through official correspondence, the works in the meantime being at a standstill.

At the north pier of the harbour, the opening work of the official year was to undo much of last year's work, by removing 266 of the large wave-breaker blocks which had been ordered to be placed in orderly rows instead of being dropped in at random as in the sanctioned design, and to deposit others to a section of 40 feet from the bonded wall at high water mark. The setting of these blocks in uniform rows was a slow and most difficult undertaking, as the foundation for them between the old and new walls had to be levelled up by divers at a point where the sea was generally too rough for a diver to remain below water without great risk. The raising of these 30-ton blocks required the greatest skill and attention, but the delay caused in raising them cannot be regretted, as the work is now more substantial, and the alterations were accomplished without any serious mishap. This arm of the harbour then made rapid progress until the 12th of July, when a telegram was received directing a second stoppage of all further work until the necessity of inserting a special abutment in the superstructure had been argued out. The Engineer in charge of work, as soon as he took the matter up, found that this special abutment (which would also have been a point of weakness) was not required at all in the pier for which it was intended, and that he could open up the entrance designed by Mr. Parkes without it, if the latter should ever be necessary, whereupon the orders were withdrawn and the work of building the superstructure commenced in earnest early in August and continued without any further interruptions to the close of the year.

It is gratifying at last to know that this great work, as far as it has gone, and all future proposals for its completion, have met with the entire approval of Sir Alexander Rendel, and that it will, in all probability, reach an early and satisfactory completion in the hands of the Harbour Staff. Notwithstanding hindrances which reduced the official year to only 76 working days, 726 large blocks were set in the superstructure by divers, advancing the work by a length of 454 lineal feet, which

makes the present termination of the north pier 3,279 feet from the commencement of the blockwork, begun in the year 1876.

The wave-breaker to the north pier necessitated 523 large blocks being deposited by the titan crane to bring this protection up to the end of the built superstructure. This screen on the outer-straight portion of the north arm of the harbour, should be made to a width of 40 feet east or seaward of the pier, but as the special crane sent out for the purpose with the extra overhang is doing work at the south pier, the north pier titan crane has to deposit the blocks instead. The drawback to the titan crane being used is that its greatest reach or overhang is only 28 feet from the wall, which means that this important protection to the north pier can never be made up to its full strength until the new "All Round Titan Crane" designed and already indented for has been received and erected on the works. This new crane will be capable of doing the work of all the three cranes now in use, and will have other special movements which have been found wanting in the present cranes. It will also be the future wharf crane of the port for landing all heavy machinery, guns, cargo, &c., and will also be capable of dredging from either pier, or deepening the entrance at a radius of 70 feet from its wheel base.

Four thousand two hundred and four tons of rubble stone were deposited from boats into the north pier base or foundations to complete the required section of base.

The work of making concrete blocks was carried on steadily until the locomotive for the purpose completely broke down, when all work under this branch of the work had to wait until a new and more powerful engine arrived from England. Under the circumstances, 3,035 concrete blocks were made in the year, of which 1,751 were for the superstructure. The contents of these blocks represented an outturn of 38,983½ cubic yards of concrete.

Seven thousand five hundred and thirty-four tons of Portland cement was used during the year, all of which was from England delivered through the India office.

The total quantity of materials required from the Pallavaram quarries was far in excess of the previous year's outturn: 61,083½ tons was the outturn of stone which was brought to Madras in 10,142 South Indian Railway wagons. Of this quantity, 19,028 tons was stone for the rubble base, and the balance, 42,055½ tons, was specially blasted stone called chips for block-making.

The progress made at the south pier was very good. Three hundred and seven blocks were set in the superstructure by divers, which advanced this arm by 187½ lineal feet, making the total length of the superstructure 3,706½ feet from the first block set in situ. An enormous steel caisson is to terminate this pier head, and the solid mass of concrete to be formed by it will weigh no less than 5,000 tons. This caisson has been ordered and is being supplied through the India office.

The wave-breaker protection at the south pier was generally strengthened throughout the curved portion of the pier and along the newly built superstructure to a width of 40 feet from the superstructure, which section can be carried out at this arm with the special wave-breaker crane which was transferred from the north pier, and in place of which the new crane has been ordered. This crane deposited 493 wave-breaker blocks, completing the wave-breaker screen to the full section as it travelled outwards to sea.

In April the south pier rubble base was extended a short distance towards the old pier head by adding 2,116½ tons of material made up of 1,927½ tons of rubble from Pallavaram deposited by boats and 189 tons of base added by blasting a few of the blocks which had fallen from the old wall, the removal of which was carried out either by the pontoon or by blasting with dynamite. In September a further deposit of 1,274½ tons of stone was made to the base as follows:—360½ tons of rubble was used in the foreshore, 562½ tons in the foundations, and 351 tons was formed into rubble by blasting old blocks recovered by the pontoon from the old south pier.

The south pier rubble base was paved or consolidated with Portland cement concrete for a length of 139 running feet by a width of 20 feet. This method of protection is in lieu of the proposal made by Mr. Parkes to form an apron along the superstructure by filling bags with concrete and setting them upon the base. The original proposal would have necessitated heavy plant being got out from England, which would have delayed progress and have been more costly; while the protection would

not have been equal to a proposal which the Engineer in charge made and successfully experimented with, previous to the arrival of Sir Alexander Rendel, who, after his inspection, proposed that this method should be adopted, as it afforded a better protection against a scouring sea, was more economical to carry out, and required no extra machinery.

A marine survey of the Harbour and Madras Roadstead was made in July, August and September, repeating exactly, on the same lines, the extensive surveys of 1878—1882 and 1886. From a careful comparison with these former surveys, the general depth of water inside the harbour remains about the same as heretofore. The depth of water at the entrance has deepened about 6 inches, while the high water mark inside the harbour has advanced slightly, due to a large quantity of sand having found its way through some irregularities in the old blockwork set in 1877. This evil, as soon as the sea was smooth enough, was stopped by filling in the spaces left between the blocks with rubble and concrete. The general contour lines outside the harbour remain the same with the exception of at the root of the south pier where accretion of sand still continues, but at a much lessening pace, as the depth of water increases. In addition to this marine survey several cross sections of the rubble bases and wave-breaker were taken during the year, all of which show, as far as the "restoration works" have gone to date, that a most careful watch has been kept upon the deposit of stone, and that the work is strictly in accordance with the required section of the foundations.

The total outlay on the works during the past year, including the interest expenditure on the protective works north of the harbour and new machinery required, has been Rs. 7,83,892, made up as follows:—

	RS.
Outlay on Works	6,59,977
Do. on Establishment	56,055
Do. on Tools and plant	24,720
Total	7,40,752
Net debits to suspense heads	42,840
Net outlay in the year	7,83,592

The total expenditure up to the end of the official year was Rs. 87,74,230 against the total estimated cost of Rs. 45,90,051.

The iron screw pile pier has been undergoing thorough repair both to the decking and T iron bracing throughout.

4. *Bangalore Water-supply.*—In July 1888 this Government forwarded to the Government of India a note by the late Chief Engineer, Colonel Hasted, R.E., on the several schemes for supplying water to the troops in Bangalore which had been elicited by the offer of a prize of Rs. 1,000, and in pursuance of the recommendations therein made, Mr. J. C. Larminie, Executive Engineer, was placed on special duty to work out those of the suggested schemes which appeared most promising. The schemes investigated by Mr. Larminie were—

(1) *The Magadi Road Scheme*, which was that proposed by Mr. Standish Lee in the prize essay. Two projects for supply from the Magadi road valley were investigated, the one to yield sufficient for the whole Civil and Military station, and the other for supply for the troops alone.

(2) *The Hebbal Valley Scheme.*—General Fischer proposed to utilise this valley as a source of supply for the troops and the Civil and Military station and for the pettah or native town, or a population of 150,000 in all; but it was shown that this was impracticable, and Mr. Larminie's project for this valley contemplated supplying the Civil and Military station (i.e., the troops and cantonment) only.

(3) *The Nagavaram Scheme*, which contemplates the utilisation of the Hebbal catchment area in addition to a further tract lower down, involving a higher lift.

(4) *The Rachanhalli Scheme*, which depends upon a valley lying to the north of the last two.

All these schemes are similar in character and propose the construction of storage reservoirs whence the water is to be pumped to a service reservoir on the Mantapah hill. After filtration it is to be distributed thence by gravitation to the cantonment

and barracks. The quantity intended to be provided is a year's supply at 12½ gallons per head per diem for 5,000 troops and 6¼ gallons for the remaining population of the Civil and Military station taken at 100,000. The garrison supply scheme provides only for the troops at 12½ gallons per head per diem.

The following are particulars of the cost, &c., of the several schemes as worked out by Mr. Larminie:—

For a year's supply.	MAGADI ROAD.		Hebbal.	Nagavaram.	Rachanhalli.
	Civil and Military station.	Garrison only.			
Cost for works	RS. 9,02,124 0 0	RS. 2,34,130 0 0	RS. 5,98,254 0 0	RS. 6,55,054 0 0	RS. 6,76,634 0 0
Annual charges (including interest and depreciation) ..	91,000 0 0	20,000 0 0	61,000 0 0	65,500 0 0	68,000 0 0
Cost per 1,000 gallons ..	0 5 9	0 14 0	0 3 3	0 4 3	0 4 6

It was considered that any scheme to be satisfactory should provide for the storage of at least eighteen months' supply; and the cost of this was estimated for the Magadi road and Rachanhalli projects, and also of a two years' supply in that last named. From Mr. Larminie's report it appeared questionable whether more than one year's supply could be counted on or stored at Hebbal or Nagavaram, and certain that the additional cost would be very great. The following were the results arrived at for the larger supplies in the Magadi road and Rachanhalli projects:—

	MAGADI ROAD.		RACHANHALLI.	
	One and half years.		One and half years.	Two years.
Works	RS. 9,73,754 0 0	RS. 7,05,634 0 0	RS. 7,64,484 0 0	RS. 7,64,484 0 0
Annual charges ..	94,105 0 0	69,200 0 0	71,000 0 0	71,000 0 0
Cost per 1,000 gallons ..	0 5 11	0 4 5	0 4 7	0 4 7

After a careful consideration of the merits of the several schemes, the Government arrived at the conclusion that the Rachanhalli project possessed undoubted advantages over the others. With respect to the Hebbal and Nagavaram schemes, the Rachanhalli basin was found to be less exposed to contamination and far more favorable both for catchment and storage. As compared with Magadi road, the water of the Rachanhalli valley was probably somewhat less pure, but the considerably larger catchment of the latter and the greater cheapness of the scheme far outweighed this disadvantage. A further reason for preferring the Rachanhalli to the Magadi road scheme was that the appropriation of the latter valley would interfere with the claims of the Mysore Government upon it as the most natural and attainable source of supply for the pettah or native town of Bangalore. The lift from it to supply the pettah would be much less than is necessary to gain command of the Civil and Military station, and it may be said roughly that 1½ years' supply for the latter would be only a year's supply for the two together. It was, moreover, doubtful whether the catchment area as taken by Mr. Larminie would yield 1½ years' supply for both the cantonment and native town, and it was considered that, whatever may be done as regards the supply of the pettah, it was very desirable that an independent source should be adopted for that of the cantonment and the troops. The adoption of the Rachanhalli scheme was therefore recommended to the Government of India. In January 1890, the Government of India intimated that after careful consideration it had been decided to place the preparation of a definite project for the water-supply of Bangalore in the hands of the Inspector-General of Military Works in communication with the Resident in Mysore, and the further disposal of the question thus passed out of the hands of the Madras Government.

5. *Ootacamund Water-supply.*—The water-supply scheme for the northern side of Ootacamund was finally completed during the year, and an estimate, amounting to

Rs. 6,575, for connecting private houses with the system was sanctioned. This latter work was undertaken by the Public Works Department on behalf of the Municipality, and the cost was met from contributions paid by owners of the houses. In July 1889 it was decided by Government that the future maintenance of the water-supply system, estimated to cost Rs. 984 per annum, should devolve on the Municipal Council, and the transfer was effected at the end of the official year. When the improvement of the water-supply of Ootacamund was originally taken in hand, the entire catchment area of the Marlimund reservoir was protected by a wire fencing 14,031 feet in length. It was subsequently found that this fencing afforded the gathering ground and reservoir no protection from pollution, as numerous rights of way existed across the catchment area, and a considerable number of cattle were kept within it. At the close of the year proposals were under consideration to remove the wire fencing and to construct in lieu, with the same material, a strong fence round the water-spread of the reservoir.

6. *Water-supply of the Lawrence Asylum, Ootacamund.*—The system of water-supply to this Asylum, by which water was pumped up to the building by steam machinery, was found to be unsatisfactory and expensive, and a new scheme which had been drawn up some time previously by Mr. deWinton, Executive Engineer, and which provided for the supply of all the buildings by direct flow, was undertaken during the year. It was at first proposed that the cost of the new system, estimated at Rs. 12,350, should be met from Imperial funds, and the Government of India made an allotment for the purpose, but as Asylum funds subsequently became available, the Imperial grant was withdrawn and the Asylum Committee provided the necessary money for the project, which was thereupon transferred to the head Contribution Works. An indent for the iron pipes, &c., was forwarded to the Home Government early in the official year, and the stores were received in February 1890. By the close of the year the new service reservoir and the masonry cistern at the girls' school were practically completed, and a large portion of the piping was laid. It is estimated that the new system will save the Asylum a considerable sum in annual maintenance, while the water-supply will be more regular and of better quality.

7. *Artesian boring in the Kortalayár Valley.*—In the Administration Report for 1888-89, it was mentioned that, on a report from the Geological Department, this work was stopped when the boring had reached a depth of 405 feet. Before operations were suspended, the actual depth reached was 420 feet, and a sum of about Rs. 8,000 had been spent on the work. In May 1889, on a strong representation from Mr. A. P. deClosets, the contractor, the Government authorised the boring to be carried down to 450 feet, and an allotment of Rs. 500 was made for the purpose. Work was accordingly resumed, when at a depth of 441 feet a bed of limestone of unknown thickness was struck. The certain prospect of incurring further large expenditure with very doubtful results induced the Government at this stage to discontinue the experiment finally, and the removal of all the plant was ordered.

8. *Artesian boring at Tuticorin.*—A project for the supply of water to the town of Tuticorin having been under consideration, it was considered that before incurring any large expenditure in bringing water to the town from sources outside its limits, it would be advisable to ascertain whether artesian springs existed within the station. It was therefore decided, after consulting the Geological Department, to make an experimental boring, and an estimate, amounting to Rs. 7,980, was sanctioned for the work. The plant which had been in use in the Kortalayár valley was transferred to Tuticorin, and at the close of the year preparations had been made to commence the boring.

9. *Gopálpur Pier.*—This work was completed according to the estimates in 1888, and notifications were issued in that year prescribing scales of fees for its use; but it was found that owing to the pier not extending beyond the surf line, landing and shipping operations could only be carried on at it under the most favorable circumstances of wind and weather. During rough weather, the surf breaks a considerable distance beyond the pier head, rendering traffic from it impossible, and urgent representations were made by the local trading community that the levy of pier dues should be suspended until the pier could be made serviceable. The professional advisers of the Government, however, pointed out that the pier could not be lengthened

except at very great expense, and that even then its utility for the greater part of the year would be very doubtful. The Government was therefore constrained with much regret to decide on the abandonment of the structure, and called for estimates for its dismantlement.

10. *New Workshops for the Gun Carriage Factory, Madras.*—In October 1889 an estimate, amounting to Rs. 84,830, for constructing new workshops in lieu of the existing smiths' and turners' shops and steam hammer and boiler sheds at the Gun Carriage Factory, Madras, was sanctioned. The original estimate for the work amounted to Rs. 1,13,000, but this was revised in accordance with the wishes of the Government of India and reduced to the amount above stated. The original estimate included provision at a cost of Rs. 41,440, of 56 cast iron forges, Cyclops pattern, but in the revised estimate 28 double smiths' hearths 6' x 4' complete with tuyeres, cistern and hearth backs, estimated to cost Rs. 9,240, were substituted. The work was given on contract to Messrs. Richardson and Cruddas of Bombay, and good progress was made before the close of the year, Rs. 60,000 having been spent against the estimate of Rs. 84,830.

11. *Workshops building, Bellary Arsenal.*—An estimate, amounting to Rs. 45,500, was sanctioned for this work in August 1888, and the expenditure to the end of 1888-89 amounted to Rs. 29,531. In October 1889, after an abnormally heavy rainfall, when the building was in an advanced stage towards completion, the total expenditure having amounted to Rs. 55,642, it suddenly showed signs of failure, numerous large cracks appearing both in the main and cross walls. The site was selected as the only suitable one by a committee in October 1889, of which the Executive Engineer was a member. Trial pits to a depth of 12 feet disclosed nothing but made soil, but the earth stood perpendicularly in the pits and appeared to be thoroughly consolidated. Other buildings stood on the same soil on either side of the site selected, and the rampart wall of the Fort running parallel to the face of the site was considered sufficient to retain the soil behind it in position. No apprehensions were therefore entertained as to the safety of the site. After its failure, the building was inspected by the Chief Engineer, who arrived at the conclusion that the cracks were due to an actual creeping of the saturated made soil towards the hollow ground that intervened between it and the ramparts of the Fort. On the recommendation of the Chief Engineer, the Government appointed a Committee to consider how the building could be utilised and to select a new site for the workshops; but after receipt of the Committee's report, the building was inspected by the Consulting Architect, on whose report the following suggestions were made to the Ordnance Department:—

(1) To dismantle the building to the plinth, and on the existing plinth-walls to place an elastic building constructed of iron pillars resting on a continuous iron frame. The sides to remain open and the building so reconstructed to be utilised as workshops.

(2) If the above were not accepted, to reconstruct the building on the same lines, but to enclose the sides with corrugated iron vertical sheeting, and to utilise it for harness and saddlery rooms for which new accommodation was urgently needed.

The Ordnance Department accepted the second alternative, which the Government ordered to be carried out; and as the erection of a fresh building for the workshops thus became necessary, a Committee was again appointed to select a suitable site. At the close of the official year, the further disposal of the question passed into the hands of the Military Works Department.

12. *Government House, Ootacamund.*—In October 1888 the Government of India, in noticing the expenditure of Rs. 14,077 on this building recorded in the Administration Report for 1887-88, expressed a desire to know what remained to complete the work in accordance with the estimate of Rs. 7,77,150 sanctioned in September 1883. In compliance with the wishes of the Government of India, as expressed in 1883, progress on the work towards completion has been gradual, moderate annual allotments having been given with due regard to other demands on Provincial revenues. In February 1889 the Government of India was furnished with a statement comparing the actual outlay on the work to the end of 1887-88, with the sanctioned estimate under each sub-head, in which the total expenditure to the end

of that year was shown to be Rs. 6,96,585. Final proposals for expenditure in 1888-89 and following years were left for consideration until His Excellency the Governor arrived at Ootacamund. In August 1889 a Committee, composed of the Chief Engineer, Public Works Department, the Private and Military Secretaries to His Excellency the Governor, and the Executive Engineer, Nilgiris, was convened to consider and report what remained to complete the building; and in accordance with the recommendations of the Committee, twenty-six out of the thirty-seven sub-heads of the estimate were finally closed, the unexpended balance on them, Rs. 5,052, being transferred to the general sub-head "Unforeseen Contingencies." Estimates to complete the work provided for in the open sub-heads were called for, and some of them were submitted and taken in hand during the year under review. The total outlay to the end of 1888-89 was Rs. 7,04,118, the allotment for 1889-90 was Rs. 10,000, and the expenditure Rs. 8,230.

13. *New Law Courts, Madras.*—A brief description of this building was given in the Administration Report for 1888-89, at the end of which year the expenditure had amounted to Rs. 1,78,513. In April 1889 detailed plans and estimates for the work, the latter amounting to Rs. 9,45,000, were sanctioned, and an allotment of Rs. 3,00,000 was provided for expenditure in 1889-90. The design, prepared by Mr. J. W. Brassington, is described as Hindu-Saracenic, and was drawn to suit the site, with façades on all four sides, the principal front being towards the sea. The work, which had been completed to the basement level at the end of 1888-89, was stopped for a short time during the rains to allow it to settle, and in the mean time the collection and preparation of materials were continued. It was then recommenced, and the brick work of the first and second floors was completed with the exception of the outer verandah, which proceeded slowly owing to the difficulty of executing stone work. The out-buildings consisting of stalls, coach-houses, tiffin-rooms and latrines were completed. The expenditure to the end of the year amounted to Rs. 2,73,646 and on the whole the progress of the work was very satisfactory. In the budget for 1890-91, a grant of Rs. 5,00,000 has been provided for its completion, and it is hoped that the building will be ready for occupation at the end of the recess in 1891.

14. *Improvements to the Examination Hall, Presidency College.*—Additional space having been required in the Presidency College to accommodate the newly formed Physical Science class, an estimate, amounting to Rs. 5,135, for extending the floor of the examination hall to the whole length of the room was sanctioned in February 1889, and the work was nearly completed during the year under review. At the end of the year only the glazed shutters for the windows and an iron grating to the north end of the room remained to be provided.

15. *Improvements to the Civil Orphan Asylum buildings, Madras.*—These buildings had fallen into a serious state of disrepair in 1887, and on an urgent appeal from the Directors of the Asylum for a grant-in-aid towards the necessary improvements, the Government allotted a sum of Rs. 6,000 in that year, and promised a similar grant in the following year on necessity being shown. In September 1887 an estimate, amounting to Rs. 16,540, for repairs to the buildings was sanctioned, and the work was intrusted to the Public Works Department. In September 1888 revised proposals were submitted, providing for an expenditure of Rs. 14,645 on new works and Rs. 13,000 on repairs, and, as a set-off, the Directors offered to make over to Government at a valuation certain of the buildings on the premises. The estimates were reviewed by the Government, and the cost reduced to Rs. 21,445, in return for which the Government proposed to take over two of the buildings at a nominal valuation of Rs. 7,000, which was afterwards increased to Rs. 10,000. The repairs, estimated to cost Rs. 13,000, were completed at a cost of Rs. 10,447, but under new works several items were added to the programme. The estimate finally accepted by the Government as the cost of work to be executed by the Public Works Department amounted to Rs. 22,878. The outlay to the end of 1888-89 amounted to Rs. 11,739, and at the close of the year under review the entire work was practically completed, only a few minor items remaining to be finished.

16. *Mahal at Gurramkonda.*—Proposals were made in 1888 for the restoration of this ancient building, portions of which had fallen into decay. The Mahal had been in charge of the District Board, and used as a travellers' rest-house, but as the

Board was unable to meet the cost of the necessary repairs, the work devolved on the Public Works Department. As in the case of other buildings of historical interest, the object in view was to fit the Mahal for useful public purposes without any destruction of its ancient characteristics or re-additions built in modern style. Before the estimate for the proposed improvements was sanctioned, it was carefully scrutinized by the officers of the Archaeological Department, and, as finally revised and approved in January 1890, it amounted to Rs. 3,277. After completion of the work, the upper floor of the Mahal will continue to be used as a public bungalow under the management of the District Board, and the ground floor will be utilised by the Public Works Department for the storage of famine tools.

17. *Inspection of Lighthouses.*—The undermentioned lighthouses were inspected by superior officers of the Public Works Department:—

Calingapatam.	Tellicherry.
Cochin.	Cannanore.
Calicut.	Mangalore.

In May 1889 the Government of India intimated that Mr. Douglass, an expert from England, would arrive in the ensuing cold weather to inspect and report on all lighthouses on the Indian coast, and the inspection of many lighthouses by the Public Works Department was deferred until the results of Mr. Douglass' investigations had been reported.

18. *Work in Estates under the Court of Wards.*—The expenditure incurred by the Public Works Department on works in Wards' Estates was as follows:—

	Original grant.	Revised grant.	Outlay.
	RS.	RS.	RS.
<i>Ganjam District.</i>			
Parlakimedi	92,250	46,470	45,321
Chinna Kimeri	18,450	2,706	2,436
Jarada	13,530	2,768	3,469
Bodagada	4,920	922	2,153
Utlam	24,231	8,487	8,224
Dharakoti	7,380	4,920	5,383
Chakapalli	984	246	96
Tarlaputta	738	...	...
Aska	1,230	369	372
Kurla	3,321	615	195
Attagada and Kallikoti	45,510	4,674	4,714
<i>Vizagapatam District.</i>			
Chidikada Jaganathapuram	6,513	6,513	1,878
<i>Godavari District.</i>			
Lakkavaram	729	975	1,385
<i>Salem District.</i>			
Ernmaipati	492	612	334
Yelagiri	2,036	1,921	1,830
<i>Madura District.</i>			
Ramnad	28,034	33,693	33,562
Gandamanayakanur	...	...	...

Two estates were handed over to the management of their proprietors during the year, the Ramnad estate in October 1889, and the Utlam estate in January 1890, and the supervision of the Public Works Department over works in those estates was withdrawn. An interesting history of the progress of agricultural works in the important Ramnad zemindari during the period it was under the management of the Court of Wards was prepared by Mr. W. Jopp, Executive Engineer, and printed with Proceedings of Government, No. 2789 W., dated 5th October 1889. Works on this estate were supervised by the Public Works Department from March 1885 to October 1889, and Mr. Jopp's report shows that notwithstanding great difficulties in obtaining labor and materials—difficulties which were enhanced by the absence of roads—the total expenditure on agricultural works alone during that period was over three lakhs of rupees, and that 650 tanks were repaired out of a total of 922.

The short expenditure on works in estates in the Ganjam district in 1889-90 was again the subject of unfavorable comment, and due notice was taken of the want of vigor on the part of the officers responsible. The poor results were, however, partly explained as being due to frequent changes of subordinates owing to sickness, and to many of the subordinates employed on the estates having been withdrawn for famine duty.

19. *Presidency Public Works Stores.*—Lieutenant-Colonel S. C. Clarke, R.E., Executive Engineer, 1st grade, continued in charge of the Public Works Stores and Workshops, and the stock of the Public Works Stores was checked by him during the year.

The opening balance of the year was RS. A. P.
and the receipts were as follows:—

	RS.	A.	P.
From the Military Department	527	0	0
„ London	34,526	4	7
„ Public Works divisions	55	4	1
„ Presidency Workshops	13	3	2
„ Local purchase	200	8	0
„ Provincial Revenue	90	10	11
	35,412	14	9
Total	1,81,703	12	0

The issues were—

	RS.	A.	P.
To Public Works divisions	6,649	2	5
„ Public Works Workshops, Madras	13,342	1	1
„ Public Works Stores tools and plant	4	6	0
„ Civil Department	10	1	11
„ Military Department	183	5	5
„ Guaranteed Railway Department	272	1	11
„ Private sales	1,295	8	5
„ Sale by public auction	151	8	8
„ Loss by sale of surplus stores	84	10	11
„ Loss by sale of stores by public auction	744	10	9
	22,737	9	6

Leaving a closing balance of RS. A. P.
or Rs. 12,675-5-3 more than the opening balance. The authorised limit of reserve stock is Rs. 1,50,000, and the closing balance was thus Rs. 8,966-2-6 in excess of the limit. The increase was due to iron, &c., received from England during the year.

The original grant for the purchase of tools and plant and stock materials Rs. 40,000, was subsequently raised to Rs. 47,500.

	RS.
The expenditure was under tools and plant	15,630
and under stock	33,324
or a total of	48,954

Under repairs and carriage Rs. 7,983 were spent against a grant of Rs. 7,000.

Twenty-eight consignments of stores were received from England and 50 shipments were made by steamers, viz., 47 to the Northern Ports, 1 to London, and 2 to Tuticorin.

Iron work was received from England for the Talavasal bridge in the Salem district; pipes, &c., for the water-works at the Lawrence Asylum, Ootacamund; Decauville's tramway for the Rushikulya project; iron girders for the new Law Courts at Madras; rolled iron joists for the Nellore division; 13 spans iron work each 61 feet clear for the Gadilam bridge at Cuddalore; 1 light half out-rigged boat with oars, switch crossings 30" gauge with rails and tipping waggons, and 2 centrifugal pumps 6" and 2" for the Periyár project. One boring apparatus with tubes, 1 vertical boiler 6 H.P., 1 coal winch, &c., were forwarded to Tuticorin for the experimental artesian boring at that station.

20. *Presidency Public Works Workshops.*—The following is a statement of the work done in the shops during the year under review as compared with the previous year:—

	1889-90.	1888-89.	More than 1888-89.	Less than 1888-89.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Work done for the Public Works Department	77,701 6 5	82,210 13 11		4,509 7 6
Do. for other Departments	43,165 9 2	31,114 0 7	12,052 8 7	
Do. for private parties	3,884 7 2	4,305 12 5		421 5 4
Total	1,24,752 6 9	1,17,630 11 0	12,052 8 7	4,930 12 10

The decrease in the outturn of work may be accounted for by the fact that several private foundries have been established at Madras during recent years.

The value of machinery and plant in the shops at the beginning of the year was Rs. 1,07,908-8-6. After deducting 4 per cent. for depreciation and adding certain receipts amounting to Rs. 3,261, the balance at the end of the year was Rupees 1,06,347-10-11. The expenditure on tools and plant and machinery was Rs. 4,294 and that on new plant was Rs. 3,004.

21. *Reduction in the Drawing Branch, Chief Engineer's Office.*—In the Administration Report for 1888-89, the abolition of the Government Lithographic Press and the transfer of its work to the Madras Survey Department was noticed. From 1st April 1889, a drawing office composed of seven draftsmen and menial establishment, costing Rs. 437 per mensem, was added to the Chief Engineer's office, the work intrusted to this branch being the preparation for the Survey Department of enlarged drawings for photo-lithography. In accordance with the orders of Government, the Chief Engineer, towards the close of the year, submitted a report on the work turned out by the drawing office, and after reviewing this the Government arrived at the conclusion that the establishment maintained was in excess of requirements. A further reduction of Rs. 111 per mensem was therefore ordered, and the establishment retained was composed of four draftsmen and one lascar costing Rs. 326 per mensem.

22. *Abolition of Government Printing Presses at Dowlaishweram and Bezvada.*—For several years past a small printing press had been attached to each of the offices of the Superintending Engineers, I and II Circles, at Dowlaishweram and Bezvada. The work turned out by these presses consisted purely of departmental forms and circulars, which could not be printed locally with sufficient despatch and accuracy. The press at Dowlaishweram cost about Rs. 1,000 per annum in establishment and contingencies, and that at Bezvada about Rs. 700. In February 1889 the Government directed that proper work books should be maintained in the presses, so that the value of the work turned out might be shown, and the establishment of the Dowlaishweram press was reduced to the same limit as that of the Bezvada press. During the year under review, the question of the necessity for the further maintenance of these printing presses came under consideration, and it was decided that the time had arrived when sufficient reason for their upkeep had ceased to exist. The abolition of the presses at the end of the year and the sale of the plant were therefore ordered.

23. *Reduction in the Public Works Workshops, Dowlaishweram.*—The approaching completion of the Godavari delta project having caused a considerable diminution in the outturn of work from the workshops, it became necessary to curtail the working expenses to prevent the large annual loss which the accounts of the institution disclosed. Accordingly, in submitting his report on the transactions of the shops for the year 1888-89, the Superintending Engineer made proposals for reducing their cost. For administrative purposes the workshops had been treated as a sub-division of the Godavari Eastern division, but with regard to accounts they had been worked as a separate division of the I Circle, necessitating an expensive office establishment. On the recommendation of the Chief Engineer for Irrigation, the post of Deputy Superintendent was abolished, and the workshops were converted into a sub-division of the Eastern Delta division both with respect to control and accounts. This admitted of the special accountant and a portion of the office establishment being dispensed with; the annual maintenance grant of Rs. 1,000 was reduced by one half,

and some of the buildings, machinery and the dry dock were transferred to other heads of account to relieve the workshop charges. The change will further admit of the discontinuance of the elaborate annual administrative accounts which have hitherto been maintained, as the shops will now be worked as an ordinary Provincial sub-division.

24. *Type designs for iron bridges.*—In the report for 1888-89 a description was given of a series of type designs for iron bridges which had been obtained from England with a view to facilitate designing and estimating in this country by Public Works and District Boards Engineers. The bridges included in those designs vary from 5 to 152 feet span, and may be divided into three main classes:—

- (1) Those in which the floor plates are used as girders.
- (2) Those with rolled iron girders.
- (3) Those with Whipple-Murphy trusses.

The list did not include any plate, wooden or lattice girders.

Owing to the difficulty of obtaining skilled labor for erecting iron bridges in India, it was considered that pinned bridges would be preferable to rivetted ones, and in the type designs furnished there are no members which would require to be rivetted in this country.

From Sir A. Rendel's reports on designs sent to England with indents for iron work for the Gadilam and Talavasal bridges, it appeared probable that the advantages of pinned girders had been over-estimated, and as there was strong evidence to show that rivetted bridges would ordinarily be both cheaper and stronger, the Chief Engineer, Public Works Department, recommended that a further selection of type designs should be obtained to enable Engineers to select a bridge which would be most suitable in reference to the part of the country in which it has to be erected. While admitting that the assistance afforded by the type designs already sent out in estimating and indenting had been very great, the Chief Engineer strongly recommended that the list should be made more complete by the addition of plate, lattice and other rivetted designs for iron bridges, the new types to comprise bridges from 5 to 150 span. These proposals were approved and the Secretary of State was addressed accordingly.

About the same time, the Malabar District Board's Engineer, Mr. G. Anderson, who had made the construction of iron bridges a special study, pointed out that the type designs forwarded from the India office provided for enormous loads which would never come on the bridges, and that their general adoption would entail on District Boards a great and unnecessary increase in the cost of construction. While it was pointed out that it was not incumbent on District Boards to adhere to the type plans which had been circulated merely as examples to assist Engineers, Mr. Anderson's observations were forwarded to the Secretary of State in continuation of the Chief Engineer's proposals.

In the mean time independent proposals had been made at home by Sir A. Rendel recommending the preparation of a new series of designs for rivetted bridges for 40 feet, 50 feet, 60 feet, 70 feet and 80 feet spans, and on receipt of the suggestions of the Madras authorities, the Secretary of State intimated that the proposal that the new series should include girders of 5 to 150 span would be considered when replies had been received from the Governments of India and Bombay who had been communicated with on the subject. The correspondence rested at this stage at the close of the year.

25. *Famine Relief Works.*—The famine relief projects in the Ganjam district carried out under the supervision of the Public Works Department were noticed in the report for 1888-89. These works were continued as relief works in 1889-90 until November when the pressure of famine ceased. The principal projects on which famine labor was employed under the Public Works Department were—

- The Rushikulya project.
- The Ganjam-Gopálpur canal.
- Strengthening the course of the Bappayapuram gedda.
- The Tekkali-Anantigiri road.
- Two miles of the Hiramandalam-Battili road.
- The Kalikot-Boirani road.
- The Ichápur-Jarada road.

On the closure of famine relief operations, the Rushikulya project, the utilization of which as a relief work was accidental and temporary, was continued as an ordinary protective work; the Bappayapuram gedda, which had been nearly finished, was ordered to be carried to completion by the Public Works Department, and the roads above mentioned, which had been undertaken as professional agency works, were transferred to the District Board. The Ganjam-Gopálpur canal was put in hand in January 1889 as a relief work, and on the cessation of relief operations, the expenditure had amounted to about Rs. 1,30,000. The total estimate for the project amounted to Rs. 4,51,145, and the question arose whether it should be further prosecuted to completion. After careful consideration it was decided that the advantages to be gained from continuing the project were not commensurate with the probable cost, especially as the proposed East Coast Railway would run close to the line of the canal, and it was therefore ordered to be abandoned. The local Public Works officers were directed to draw up a report placing on record the work that had been done, and to arrange to have all cuttings in the vicinity of roads and tracks so dealt with by means of spoil banks and hedges as not to be a source of danger to travellers and the general public.

26. *Practical training in the Public Works Department of Students of the Madras College of Engineering.*—Early in the year, the first batch of students of this College who had completed their theoretical course of three years under the new scheme sanctioned in 1886, were posted to the Public Works Workshops, Madras, for their first year of practical training in Mechanical Engineering. They consisted of four students of the Engineer class, and thirteen of the Engineer subordinate class. At the end of 1889 after completion of the workshop course, the students were drafted to various large works in progress to undergo their second year of practical training. The two senior members of the Engineer class, on the satisfactory completion of this practical course, will be appointed Assistant Engineers in the Department in accordance with the sanction of the Government of India, and several members of the subordinate class will be provided for on the permanent Upper Subordinate Establishment.

27. *Accounts Branch.*—The Committee appointed by the Government of India to inquire into the possibility of reducing and simplifying the system of divisional accounts assembled at Madras in March 1889, and examined a number of witnesses by means of written questions. The conclusions arrived at by the Committee were embodied in a report which was submitted to the Government of India in July 1889, from which it appeared that there was a general consensus of opinion among the Executive officers of the Department that the accounts which they were required to submit were over-elaborated; and that there were numerous cases in which, in system or in details, forms and procedure could be simplified and account work lessened, without the loss of any useful check or valuable record, and at the same time maintaining that strict control over expenditure which is essential in the case of a department like that of the Public Works. The orders of the Government of India on the Committee's recommendations were issued in the form of a series of resolutions dating from October 1889 to February 1890, and they tended generally towards relieving Executive Engineers of a large amount of office work. The effect of these orders on Madras forms and procedure, and the question as to the best way of embodying the changes in the Madras Public Works Code, were under consideration at the close of the year. The President of the Committee, Mr. R. G. Macdonald, Deputy Accountant-General, took the opportunity while at Madras of inquiring into the constitution and cost of the Examiner's office and he drew up a note making various suggestions for reducing both the work and establishment of that office. The Examiner's replies to Mr. Macdonald's suggestions, and his proposals for reorganising his establishment with reference thereto, were forwarded towards the end of the year for the consideration of the Government of India.

28. *Formation of a Military Works Department in the Madras Presidency.*—In the year 1886, proposals were made by the Government of India for the transfer of Military works in this Presidency to the direct control of the Inspector-General of Military Works; but in view of the probable large extra cost which would be involved by the maintenance of dual establishments in many stations, the introduction of the scheme was not advocated by this Government. In September 1889, the Government

of India intimated that after further consideration, it had been decided to introduce the new system of Military works administration in a modified form, namely, that the change should be applied only to the large Military stations or groups of Military stations where the work was sufficient to require the entire services of an Executive Engineer, and that the Military works at the smaller stations should continue to be carried out by the agency of the Public Works Department. The stations in the Madras Presidency, which it was proposed to transfer to the new Madras Military Works Command, were Madras, with the adjacent stations of St. Thomas' Mount and Pallavaram, Poonamallee, Vellore Fort, Wellington, Bangalore and Bellary. These proposals were accepted and arrangements were at once made to carry them out. The Government of India posted a Superintending Engineer to the charge of the new Command, and the officer in question proceeded on arrival to take over the stations one by one, the entire transfer having been completed by the end of the official year. The average annual expenditure on Military Works at the stations named was about Rs. 3,86,000, and the average contribution paid from Imperial Military to Provincial funds on that outlay on account of establishment was about Rs. 89,000. To counterbalance the loss of this contribution, it became necessary to effect savings in the Provincial establishment; the sanctioned scale was therefore reduced by two Engineers and six Upper Subordinates, and two divisions of the Public Works Department were closed.

29. *Divisional changes.*—The special temporary division organised for the construction of the Ganjam-Gopálpur canal as a relief work was closed in December 1889, on the cessation of the famine in Ganjam, and owing to the approaching completion of the Godávári delta works, the amalgamation of the Western and Central Godávári divisions was ordered to be carried out at the end of the year, the Central becoming a sub-division of the Western division. On the transfer of Military Works at Wellington to the Military Works Department, the Nilgiri division of the Public Works Department was abolished, and the Civil Works on the Hills were formed into a sub-division of the Coimbatore division. The special Wynad sub-division which had previously been attached to the Nilgiri division was transferred to the West Coast division. Similarly, with respect to the Presidency and Bangalore division, on the transfer of Military Works, the Public Works establishments at Bangalore were entirely withdrawn, and all Civil Works at the Presidency town were made over to the charge of the Consulting Architect. The only other divisional change was the closure of the Ramnad division, when the estate was handed over to the proprietor in October 1889.

30. *Service books.*—The orders with respect to the due and correct maintenance and the verification of service books of public servants appear to have received attention at the hands of officers of the Public Works Department.

31. *Roads.*—The following statement shows the total length of road communication maintained by the Public Works Department in 1889-90:—

District.	Description of road.	Length in miles metalled through-out.	Length in miles not metalled but eroded through-out.	Average cost of maintenance per mile.	Remarks.
Visagapatam	Potinghi Ghât road	22	..	Rs. ..	
Ganjam	Potinghi-Koraput fair-weather road ..	..	30	..	
	Aska and Suradâ road	4	..	..	
	Military Rifle Range road at Berhampore.	5	..	..	
	Small roads in the Military lines at Berhampore.	5	..	..	
	Haridamallora on the Cuttack road to Nirmalaghara and Kallikotta.	3.5	..	..	
	Road from Mundamurry to Dharakota Palace including branch.	1.75	1.25	..	
	Main and cross roads to Jarada Palace.	6	..	..	
Vellore	Pennér Anicut roadway	4	..	1,667	
Kistna	Nizampatam canal left bank between Nandivelugu and Kuchipudi.	..	7	50	
	Kistna right bank between Epur and Mortota.	..	19.5	50	

District.	Description of road.	Length in miles metalled through-out.	Length in miles not metalled but eroded through-out.	Average cost of maintenance per mile.	Remarks.
Bellary	Roads to Râmandrug in Sandâr Estate.	21	..	Rs. 206	
	Bellary Cantonment	12	..	303	
Nilgiri	Kullar-Gudalur road	58	..	735	
	100. old road	..	39	60	
	Calicut-Vayitri road	39	..	678	
Chingleput	Vayitri-Gudalur road (old)	..	40	173	
	8th, 9th and 10th miles of Trunk road in St. Thomas' Mount Cantonment.	11	..	347	
	Saint Thomas' Mount Cantonment roads.	7.2	..	157	
	12th and 13th miles of Trunk road in Pallavâram Cantonment.	2.5	..	..	
	Pallavâram Cantonment roads ..	..	20	50	
South Arcot	Poonamallee Cantonment roads ..	..	6	75	
	Road on the Coleroon bank	..	10	..	
	Road on right bank of Khan Sahib's canal.	..	9	100	
	Road from 11th mile of Vriddhachalam road to Kundin Mallur via Perumal tank.	..	2	86	
	Portion of road from Shatiatope Omapulvora.	..	141	78	
Tanjore	Goverapet road	..	20	51	
Trichinopoly		10	..	149	
Madura	Branch road from Madura-Travancore road to site of Periyâr dam.	..	8.25	..	This road is in Travancore territory. Part of it will be submerged on completion of the Periyâr lake.
Periyâr Project	Branch from Madura-Travancore road to driving station of wire tramway.	..	1.5	..	This road will probably be abandoned on completion of the works.
Madras Town	Roads in Madras Cantonment ..	4.3	..	361	
	Extensions.				
Ganjam	Kallikotta-Boirany road via Atagedda.	5	4.75	..	This road was started as a famine relief work during the year and has been handed over to the District Board.
		Length in miles made.	..	Average cost per mile.	
Nilgiri	Vayitri-Gudalur road (new)	6	..	17,655	

Note.—This statement does not embrace roads in charge of District Boards and Municipalities to whom all but a few special lines of communication have been made over.

II.—PROGRESS OF WORKS.

I.—IMPERIAL.—MILITARY WORKS.

32. *Ganjam.*—Constructing a regimental school for the Native Infantry at Berhampore; revised estimate Rs. 1,680; work completed.

33. The expenditure under minor original works and repairs was Rs. 653 and Rs. 2,040 respectively. The number of original works was three, of which (1) improvements to the Military Hospital at Berhampore, estimate Rs. 110, was completed. The other two works—(1) constructing a well in the military cholera camp at Hampara, estimate Rs. 330, and (2) constructing a well for the use of the public in lieu of the one reserved for the exclusive use of the regiment at Berhampore, estimate Rs. 920—could not be carried out as funds were allotted only in February 1890. The repair works in progress during the year were six in number, all of which were completed.

34. The principal works were as noted below :—

	Estimate. RS.
(1) Repairing the road leading to the Rifle Range of the 27th Regiment, Berhampore	200
(2) Erecting a pandal around the Military School at Berhampore ...	190
(3) Repairs to the Military Barracks and Hospital building at Berhampore	1,580

35. The excess outlay over allotment was to be met from the allotment remaining unspent under original works.

36. **Vizagapatam.**—The expenditure on repairs was Rs. 3,159 against an allotment of Rs. 3,500 for repairing the roads, drains and military buildings in the cantonment of Vizianagaram and those at Vizagapatam.

37. **Godavari (Eastern).**—The annual repairs to the military buildings at Sámalkóta were carried out at an outlay of Rs. 1,098 against the estimate of Rs. 1,107. An estimate for Rs. 670 was sanctioned for sanitary repairs to the military lines at Sámalkóta, but the work was not put in hand for want of funds.

38. **Bellary.**—Constructing a new workshop in the Bellary Arsenal; estimate Rs. 45,500, grant for the year Rs. 5,992, outlay for the year Rs. 5,972, outlay up to date Rs. 35,503. The walls of this building cracked and the work was condemned as a workshop.

39. Mangalore tiled roof over the existing roof of the Station Hospital; estimate Rs. 4,647, grant for the year Rs. 2,500, outlay for the year Rs. 2,503, outlay up to date Rs. 2,503. The grant was fully utilised.

40. Five double quarters for the Staff Sergeants attached to the Ordnance Department; estimate Rs. 35,350, grant for the year Rs. 6,880, outlay for the year Rs. 6,848, outlay up to date Rs. 6,848. Foundations were completed, great trouble being experienced in getting them in owing to the sub-soil being honey-combed with pits formerly used as grain pits.

41. Re-roofing the verandahs of married ranges, European Infantry barracks, Bellary; estimate Rs. 18,760, grant for the year Rs. 4,263, outlay for the year Rs. 4,591, outlay up to date Rs. 11,135. Out of six ranges, No. 3 range was completed and No. 1 was in progress at the end of the official year.

42. Twenty-six minor new works were carried out at an outlay of Rs. 8,564.

43. The total outlay under repairs, Military, was Rs. 45,382. This sum was expended in the maintenance and repairs of the military buildings and roads including the Barrackmaster's expenditure on petty repairs and compensation for inferior and hired quarters.

44. **West Coast.**—The following works were completed or in progress :—

(1) The third new block of barracks for fifty men at Malapuram was completed and occupied. Lightning conductors for military buildings at Malapuram were fixed. This work completed the scheme of additional barrack accommodation for troops at Malapuram.

The outlay on the work up to the end of the year was Rs. 1,78,758 against an estimate of Rs. 1,78,319.

(2) *Constructing sheds for transport animals, Calicut.*—The bullock and cart shed in two blocks, as also the foundations for mule and elephant sheds, completed; outlay Rs. 5,092 against an estimate of Rs. 11,74.

(3) *Constructing a Bakery at West Hill Barracks, Calicut.*—Walls raised 2½ feet high; Rs. 896 were spent against an estimate of Rs. 4,300, grant Rs. 500.

(4) *A Slaughter-house at West Hill, Calicut.*—Superstructure nearly completed and materials for roofing ready; estimate Rs. 3,450, outlay Rs. 1,643.

(5) *A Soldiers' Institute at Cannanore* was completed for Rs. 382, and another at Malapuram was in progress on which Rs. 610 were spent.

(6) *The conversion of the contagious disease ward* into Commissariat Serjeant's quarters at Malapuram was commenced late in the year and almost completed; outlay Rs. 1,325, grant Rs. 1,500.

45. **Nilgiris.**—The following work was in progress :—

Constructing quarters for three Apothecaries at Wellington.—Outlay Rs. 15,794 against an estimate of Rs. 16,000.

46. **Minor Works.**—Expenditure Rs. 2,527. The principal works were—

(1) Laying 2-inch pipes from the drinking cistern to the Station Hospital at Wellington; outlay Rs. 23.

(2) Fixing boundary stones for the Wellington cantonment; outlay Rs. 86.

(3) Improvements to Government Bakery at Wellington; outlay Rs. 58.

(4) Purchasing and repairing the Basel Mission property at Vayitri occupied by Serjeant Instructor, Wynaad Company, Malabar Volunteer Rifles; outlay Rs. 90.

47. The works in Wellington and Wynaad sub-division were handed over to the Military Works Department and West Coast Division respectively during the close of the year.

48. Repairs were executed to the Lawrence Asylum and the other military buildings at a cost of Rs. 2,399 and Rs. 20,294 respectively.

49. **Coimbatore.**—The following minor works were completed during the year :—

(1) Sinking a well in Stud lines, Remount Depôt, Hosúr, and constructing a masonry conduit; outlay during the year Rs. 271.

(2) Extending the existing weir of the Jegoor tank at the Remount Depôt, Hosúr; outlay during the year Rs. 200.

(3) Constructing masonry drains in the stack yard, Remount Depôt; outlay during the year Rs. 287.

(4) Repairs and improvements to the Hospital, Remount Depôt; outlay during the year Rs. 297.

50. The following minor works were in progress :—

(1) Sinking a well near Stud lines, Remount Depôt, Hosúr.

(2) Constructing a barbecue for cleaning the gram in the Remount Depôt.

51. The outlay under repairs including compensation in lieu of quarters and rent of hired buildings for the Medical and Military subordinates amounted to Rs. 5,239 against an allotment of Rs. 5,263.

52. **Madras.**—The new workshops for the Gun Carriage Factory, Madras, were being built on contract by Messrs. Richardson and Cruddas of Bombay. The Smiths' shop has been two-thirds built, and materials for the Turners' shop and Steam-hammer shed were nearly all at site. Rs. 60,000 were spent on the estimate of Rs. 84,830.

53. The system of the water-supply of the Gun Carriage Factory was improved and the work almost completed at a cost of Rs. 5,059 against an estimate of Rs. 5,005.

54. Rs. 3,500 were spent on an estimate of Rs. 4,020 in rebuilding the south and east walls of the factory.

55. Re-roofing of 9 out of the 18 blocks of the Ordnance lines was completed, and materials for the remainder were collected. Rs. 32,766 were spent on the estimate of Rs. 51,598.

56. A new shed was built for the Camp Equipage Depôt at an outlay of Rs. 7,050 on the estimate of Rs. 6,935.

57. Alterations to the Rifle Butts at Veyasarpady were in progress. The stop butt which is to be 45 feet high was raised 15 feet. The expenditure incurred was Rs. 3,998 on the estimate of Rs. 6,076.

58. Extension of shed No. 1 in the Army Clothing office was commenced, and materials, consisting of iron roof trusses, tiles, timber, asphalt, &c., collected after the work was taken over from the Consulting Architect in February 1890. Rs. 6,124 were spent on the estimate of Rs. 13,370.

59. Improvements to the Final Blending house at the Gun Powder Factory, consisting of raising of the walls and provision of new roof and verandah, were in progress. The brick work was completed and materials for the roof collected. The expenditure was Rs. 2,667 on the estimate of Rs. 8,320.

60. Under Minor Original Works the principal works carried out during the year were—

(1) Converting a portion of the lower story of the Regimental Workshop in Fort St. George into an Armourers' shop for a Regiment of European Infantry; estimate Rs. 2,367, total outlay Rs. 2,230.

(2) Constructing two latrines for males and females for the 3rd Regiment Native Infantry at Perambur; estimate Rs. 2,031, expenditure Rs. 1,849.

(3) Reconstructing Police guard-room at the Gun Carriage Factory; estimate Rs. 2,460, total outlay Rs. 2,120.

(4) Constructing V-shaped drains at the Ordnance lines; estimate Rs. 758, outlay Rs. 694.

(5) Erecting an enclosure wall to the timber yard at the Gun Carriage Factory; estimate Rs. 1,750, outlay Rs. 1,750.

(6) Constructing huts on the Poodoopet maidan for transport attendants, Commissariat Department; estimate Rs. 1,200, outlay Rs. 1,200.

(7) Constructing a verandah in front of old choultry gate now used as Commissariat ration shed in Fort St. George; estimate Rs. 650, outlay Rs. 583.

(8) Alterations and improvements to D. Block Family Quarters in Fort St. George; estimate Rs. 582, outlay Rs. 528.

61. Under Repairs, repairs to 32 buildings, &c., were carried out, and the annual contribution of Rs. 6,000 for the maintenance of the Esplanade and Fort Beach roads was paid to the Madras Municipality.

62. **Bangalore.**—The additions to the public buildings for a Native Regiment of Infantry at the Arab lines were in progress.

63. Public buildings for a Native Cavalry Regiment at Byadarhally near St. John's Hill were commenced on 13th January 1890. The different buildings sanctioned for execution were—

(1) One block containing armourer's shop, ammunition store, guard-room and cells, and school.

(2) *Horse Infirmary.*—This work was discontinued by orders from Army Head Quarters.

(3) Forage yard.

(4) Six combined saddle rooms and places of arms.

(5) Two wells and one water-lift.

(6) Four latrines.

64. Good progress was made with all the above, the expenditure being Rs. 14,645 against a grant of Rs. 20,000. The whole grant was not utilised owing to the very late date in the year on which the site finally built upon was approved by the Military authorities.

65. Completing the drainage of the Pioneer lines; estimate Rs. 6,428. This work was about a third completed.

66. Quarters for a Sergeant Instructor for Colar Gold Fields Company of Volunteers were commenced. This work was being carried out by the Mysore Public Works Department. A sum of Rs. 2,389 was paid against an estimate of Rs. 3,100.

67. The proposals sanctioned by Government for the introduction of Regimental Institutes were carried out with the exception of a cook-house to British Cavalry Institute.

68. Twenty-five military minor new works were undertaken during the year at a cost of Rs. 5,957. Rs. 1,200 and 6,300 were paid to the Municipality of the Civil and Military station of Bangalore for conservancy of the main sewer and maintenance repairs to military roads respectively.

69. **Chingleput.**—Work on the new barracks for 200 men at Poonamallee, estimate Rs. 1,66,885, was in progress. The main walls, which had been raised to basement level at end of 1888-89, were during 1889-90 raised to a height of 20 feet.

70. Nine minor new works were completed during the year.

71. Repairs to sixty-three buildings and several minor repairs were carried out at a total expenditure of Rs. 18,649; and the roads in the Cantonments of Mount and Pallavaram were maintained at an outlay of Rs. 4,952. The total expenditure under Repairs, including Barrack Master's petty repairs, compensation for quarters, &c., was Rs. 29,853 to date of handing over charge to the Military Works Department.

72. The more important buildings repaired were—

The Army School.

The East and West Barracks,

The Mess-house at the Mount, and

The Depot Barracks at Poonamallee.

73. **North Arcot.**—After the transfer (on 10th and 11th March 1890) of the military works, the execution of the works in progress remained with Executive Engineer, North Arcot, till 31st March 1890 at the instance of the Military Works Department, the outlay incurred being debited by transfer to the Military Works division.

74. Under Major Original Works, accommodation for two Companies of Native Infantry in Vellore Fort was in progress; estimate Rs. 2,825, expenditure Rs. 3,446.

75. Under Minor New Works, improvements were carried out to the Pension Pay office in the Vellore Fort and a tiled roof was provided instead of a thatched one to the contagious disease shed of the Garrison Hospital, besides a few other petty minor works.

76. Under Repairs, repairs to the Staff Sergeant's quarters in Vellore Fort were commenced, and the annual maintenance of the Vellore Cantonment roads, &c., was attended to.

77. **South Arcot.**—Rs. 180 were spent on account of rent of quarters of the Sergeant Instructor of the South Indian Railway Volunteer Rifle Corps.

78. **Trichinopoly.**—The construction of two out of the three new latrines, sanctioned for the South Infantry lines, was in progress at an outlay of Rs. 1,065; the guard-room of the IV Pioneers, now used as workshop, was re-roofed at a cost of Rs. 705; the solitary cells of the 17th Regiment were provided with ventilators; and the camping ground of the South Infantry lines was surveyed, levelled and demarcated at a cost of Rs. 64.

79. Rupees 4,674 were spent in repairing buildings and maintaining cantonment roads at Trichinopoly.

80. In the Tanjore, Madura and Tinnevely divisions Rs. 1,550 were paid on account of compensation for quarters to the Military and Medical subordinates.

81. **Consulting Architect—Madras—Major Works.**—Constructing sheds Nos. 2 and 3 for the Army Clothing Department; estimated cost Rs. 14,143, expenditure Rs. 14,215. Completed and handed over to the Army Clothing Department.

82. Constructing Packing-shed, Army Clothing Department; estimated cost Rs. 6,585, expenditure Rs. 6,006, difference Rs. 579. Completed and handed over to the Department.

II.—IMPERIAL—CIVIL WORKS.

83. **Ganjam.**—Repairs were executed to the Post offices at Sompét and Ichápur at a cost of Rs. 366.

84. **Vizagapatam.**—The repairs to Post offices at Koraput, Párvatipur, Narsapatnam and Bimlipatam were carried out at a cost of Rs. 635 against a grant of Rs. 750.

85. Repairs to the Telegraph office and out-buildings and the signallers' quarters at Vizagapatam were executed at a cost of Rs. 383 against an allotment of Rs. 500.

86. **Godavari (Eastern).**—The Post offices at Sámalkóta and Poddápúram were repaired at a cost of Rs. 413 against a grant of Rs. 410. The Telegraph office and signallers' quarters at Cocanada and the Telegraph office, Rajahmundry, were repaired at a cost of Rs. 2,090 against a grant of Rs. 1,900.

87. **Kistna (Eastern).**—The Post office building at Bezváda was repaired at a cost of Rs. 98 against an estimate of Rs. 192.

88. The Telegraph offices at Masulipatam and Bezváda were repaired during the year at a cost of Rs. 192 and Rs. 367 respectively.

89. **Kistna (Western).**—An expenditure, amounting to Rs. 16, was incurred to complete the repairs of the Telegraph office at Guntur.

90. **Nellore.**—The Post office at Kávali was repaired at a cost of Rs. 37 against an estimate of Rs. 60.

91. **Bellary.**—*Original Works, Minor.*—A sum of Rs. 144 was spent on the reflooring of the Adóni Post office with granite slabs against the sanctioned estimate of Rs. 161. The work was completed.

92. **Coimbatore.**—Three minor new works were carried out at a cost of Rs. 466 as detailed below :—

- (1) Opening a window in the wall of the Post office at Mettupálayam.
- (2) Improvements to the Post office at Sulém.
- (3) Repairs and improvements to the Sub-Postmaster's quarters at Jalárpét.

93. A sum of Rs. 514 was spent against an allotment of Rs. 524 under Postal repairs.

94. The several Post offices in the division were kept in repair at a cost of Rs. 514.

95. **Nilgiris.**—Allotment Rs. 597, outlay Rs. 587, under minor works. Of this Rs. 227 were spent on postal buildings and Rs. 360 on telegraph buildings; Rs. 117 were spent on repairs to postal and Rs. 100 to telegraph buildings.

96. **West Coast.**—The work of digging a well at the Post office, Malapuram, commenced in the previous year, was completed; estimate Rs. 430, outlay Rs. 275.

97. The several Post offices in the division were kept in repair at a cost of Rs. 852.

98. **Bangalore.**—Two minor new works were undertaken at a cost of Rs. 1,056. A sum of Rs. 791 was spent under Repairs.

99. **North Arcot.**—Under Minor New Works a sum of Rs. 66 was spent on the provision of an iron gate for the Post office at Pungandú. Repairs were executed to the Post offices at Rénigunta and Venkatagirikóta and to the combined Post and Telegraph office at Vellore at an outlay of Rs. 222.

100. **Chingleput.**—A sum of Rs. 5,793 was spent on account of the repair of the Vayalur salt factory bund and the repair work proposed was in progress.

101. **South Arcot.**—A latrine in the compound of the Post office at Manjakkuppam was completed at a cost of Rs. 55 on the estimate of Rs. 68. Repairs to the same Post office and the Postmaster's quarters were also completed at a cost of Rs. 186 on the estimate of Rs. 195.

102. **Tanjore.**—Post offices at Tanjore and Kumbakónam were repaired at a cost of Rs. 497.

103. **Negapatam.**—The Post office at Meimpesal and Telegraph office at Negapatam were repaired at an outlay of Rs. 159.

104. **Madura.**—The Post offices at Butlagundu, Vadasendoor, Peermede, and Postmaster's residence at Periyakulam were repaired at a cost of Rs. 251, but payment was not made fully as the bill for re-roofing the Peermede Post office was not received from the Chief Engineer, Travancore.

105. **Tinnevely.**—The Post office at Nagerecoil was repaired at a cost of Rs. 64, and a well in the Kóttayam Post office was sunk at an outlay of Rs. 137. Both works were undertaken by the Chief Engineer, Travancore.

106. **Trichinopoly.**—Rupees 93 were spent in repairing the Post offices at Theppakulam and Kóthavalehavady at Trichinopoly.

107. **Consulting Architect—Madras—Minor Works.**—Improving Signallers' water closets and urinals, Telegraph office, Madras; total amount sanctioned Rs. 1,000, expenditure Rs. 505, savings Rs. 495.

108. Constructing additional shed at the Government Telegraph Stores; estimated cost Rs. 1,187, expenditure *nil*, balance to be spent Rs. 1,187. This work was completed with the exception of painting roof timbers.

III.—PROVINCIAL—CIVIL BUILDINGS.

109. **Ganjam.**—The following works were completed or in progress :—

(1) Rebuilding the Police hospital at Chicacole; estimate Rs. 1,480; work completed.

(2) Additions and alterations to Police Superintendent's office at Chatrapur; estimate Rs. 4,606; work completed.

(3) Constructing Police huts at Parlákimedi; estimate Rs. 7,150, expenditure up to end of March 1890 was Rs. 3,946.

(4) Constructing District Munsif's Court at Sómpt; estimate Rs. 12,360, expenditure up to end of March 1890 was Rs. 2,064.

(5) Constructing District Munsif's Court at Berhampore; estimate Rs. 11,450, expenditure up to end of March 1890 was Rs. 1,878.

(6) Constructing District Munsif's Court at Aska; estimate Rs. 11,400, expenditure up to end of March 1890 was Rs. 277.

110. The short outlay under original works was due to failure of contractors and to the difficulty in getting good wood in the sub-division, especially for work No. 6. The number of works in progress under repairs during the year were 12, and 7 of them were completed.

111. The principal works are as noted below :—

(1) Special repairs to the District Munsif's Court at Berhampore; estimate Rs. 1,670. This work will be completed by the 15th May next.

(2) Repairs to Sub-Jail at Berhampore; estimate Rs. 810. Materials (viz., wood and tiles) were collected, but the work was stopped pending the settlement of question as to the construction of a new Sub-Magistrate's Cutcherry and Sub-Jail.

(3) Repairs to Sea Customs office building at Calingapatam; estimate Rs. 890. This work was put in hand in March 1890.

(4) Special repairs to the Executive Engineer's office building at Patha Chicacole; estimate Rs. 600. This work was commenced and will be completed as soon as possible.

112. **Vizagapatam.**—The following works were completed or in progress :—

(1) Constructing 34 Reserve Police huts at Koraput; estimate Rs. 14,800, expenditure during the year was Rs. 2,684 against an allotment of Rs. 4,494. The superstructure of the four blocks completed; roof work was stopped for want of carpenters, the chief cause for the lapse of grant.

(2) Constructing an office for the Superintendent of Police at Koraput; estimate Rs. 12,030, expenditure during the year was Rs. 2,609 against a grant of Rs. 4,530. Masonry work completed; wood work at site was partly put up; work stopped for want of carpenters, the chief cause of the lapse of grant.

(3) Constructing a new Police hospital with subsidiary buildings at Koraput; estimate Rs. 10,540, outlay during the year Rs. 6,564 against a grant of Rs. 4,040. Superstructure was built up to 7 feet height, cook-room walls built up to full height, and latrine walls to 5 feet.

(4) Constructing Deputy Tahsildar's office and Sub-Jail at Potinghi; estimate Rs. 11,700, outlay during the year Rs. 2,290 against a grant of Rs. 3,134. The building was raised to basement level and stone for the walls collected.

(5) Constructing third-class Taluk Cutcherry at Sālūr; estimate Rs. 10,230, outlay during the year Rs. 2,594 against a grant of Rs. 4,745. This work was stopped from August 1889 to February 1890 pending final orders as to the treatment of cracks that appeared in the newly constructed walls. The necessary instructions were given to the Executive Engineer after personal inspection of the building by the Superintending Engineer. The greater part of it was roofed in.

(6) Reconstructing the compound wall of the District Jail at Vizagapatam; estimate Rs. 4,290, expenditure during the year Rs. 2,195 against a grant of Rupees 2,396; work completed.

(7) Constructing an hospital at Gumupur; estimate Rs. 4,020, outlay during the year Rs. 757 against a grant of Rs. 735. This work was postponed from July to December 1889 owing to site having been inundated by the floods in the river. The difficulty in procuring skilled labor from 100 miles was another cause for delaying the work.

(8) Constructing Sub-Registrar's office at Pārvatipur; estimate Rs. 2,145, outlay during the year Rs. 1,583 against an allotment of Rs. 1,790. This work was nearly completed, only the flooring of the verandah with cut stone flags remained to be done.

(9) Constructing Sub-Registrar's office at Chódavaram; estimate Rs. 2,285, expenditure during the year Rs. 1,273 against a grant of Rs. 1,885. Walls built to the top of level of the doors and windows.

113. The following minor original works were executed at a cost of Rs. 4,425 against a lump sum grant of Rs. 4,600:—

	Outlay. Rs.
(1) Altering the roof of Copyists' quarters in the compound of the District Court-house, Vizagapatam	452
(2) Making two iron record-racks for the District Court-house, Vizagapatam	469
(3) Constructing a dead-house at Yellamanchilli	211
(4) Constructing a rest-house for accommodating prisoners at Sunki	420
(5) Alterations to No. 1 cottage in the Lunatic Asylum, Waltair	741
(6) Constructing a dead-house at Chódavaram	113
Total	2,406

114. The expenditure on repairs to the following buildings was Rs. 4,425 against a grant of Rs. 4,500:—

- (1) Repairs to the Apothecaries' quarters, Pārvatipur.
- (2) Sub-divisional store-room, Vizagapatam.
- (3) District Jail buildings.
- (4) Range office at Sālūr.
- (5) Public Works Department bungalow at Potinghi.
- (6) Police Superintendent's office at Vizagapatam.
- (7) Reroofing the Zillah Jail at Vizagapatam.
- (8) Store-room at Narsapatnam.

115. **Godavari (Eastern).**—The following works were completed or in progress:—

(1) Additional buildings to the Rajahmundry College; estimate Rs. 10,500, expenditure Rs. 5,820. Concrete was laid in foundations, and all materials for the superstructure were brought to site.

(2) Additions and alterations to the Sub-Magistrate's office, Pithápuram; estimate Rs. 780, expenditure Rs. 1,109. The excess outlay over estimate was due to the provision made for record-racks being insufficient; work nearly completed.

(3) Additional accommodation, a treasury room, ryots' shed and record-racks to the Sub-Magistrate's Cutcherry at Tuni; estimate Rs. 1,180, expenditure Rs. 315. Walls were built up to 5 feet high above basement.

(4) Addition of a room to Sub-Magistrate's Cutcherry at Tuni for Sub-Registrar's office; estimate Rs. 1,590, expenditure Rs. 1,015. Walls were built up to 5 feet high above basement.

(5) Reroofing the northern godown of the Custom-house, Cocanada, with corrugated iron; estimate Rs. 1,490, outlay Rs. 1,104; work nearly completed.

(6) Lightning-conductor to the central tower of Rajahmundry Central Jail was extended at a cost of Rs. 291.

(7) Repairs to the Trinity Church at Rajahmundry were completed at a cost of Rs. 2,763.

(8) Rupees 858 were expended on repairs to Public Works Department offices and residences at Dowlaishweram.

116. **Godavari (Central).**—Constructing a District Munsif's Court at Amalápuram; estimate Rs. 13,800, outlay during the year Rs. 2,659. Materials were being collected as the commencement of the work was in abeyance pending the transfer of the site by the Revenue Department.

117. A tiled verandah was erected on the west side of the divisional office at a cost of Rs. 283.

118. **Godavari (Western).**—The following works were completed or in progress during the year:—

(1) Constructing Taluk Cutcherry at Bhímavaram, completed; estimate Rs. 25,670, outlay Rs. 24,632.

(2) Constructing Taluk Cutcherry at Narsápur, completed; estimate Rs. 23,770, outlay Rs. 24,253.

(3) Constructing a Sub-Registrar's office at Narsápur, completed; estimate Rs. 3,430, outlay Rs. 2,748.

(4) Constructing a Sub-Registrar's office at Bhímavaram, nearly completed; estimate Rs. 3,420, outlay Rs. 2,919.

(5) Constructing a Sub-Registrar's office at Ellore, completed; estimate Rs. 3,380, outlay Rs. 3,615.

(6) Constructing a Sub-Registrar's office at Tanuku, completed; estimate Rs. 3,020, outlay Rs. 3,294. Tie-rods to the cracked portions fixed, but the cracks were re-appearing and were likely to increase as the season advanced. Handing over the building to the Registration Department was postponed till the commencement of the rains.

(7) District Munsif's Court-house at Ellore; estimate Rs. 17,110, outlay Rs. 4,396. Materials were collected. Short outlay against a grant of Rs. 5,867 was due to the contractor's failure in supplying materials.

(8) Reconstructing the Divisional office building at Chettipet; estimate Rs. 13,900, outlay Rs. 6,801 against an allotment of Rs. 6,000. Materials were collected.

119. **Kistna (Eastern).**—*Repairing Collector's Residence at Masulipatam, estimate Rs. 14,305.*—The work was completed in the previous year, but during the year under review an expenditure of Rs. 628 was incurred in the settlement of its accounts.

120. *Constructing a corrugated iron goods shed in the Fort of Masulipatam, estimate Rs. 4,500.*—This work was this year fully completed with an excess expenditure over the estimate of Rs. 668, due to the fact that sufficient provision was not made for the erection of the shed, and also to the necessity for replacing some iron work broken in landing.

121. *Alterations to the Collector's Cutcherry at Masulipatam, estimate Rs. 1,163.*—This work was completed during the year at a cost of Rs. 754 against an allotment of Rs. 1,095.

122. *Extensions to Sub-Registrar's office at Bezvada, estimate Rs. 1,520.*—The expenditure amounted to Rs. 517 against an allotment of Rs. 952.

123. *Constructing a first-class Police Station-house at Buckinghampet, estimate Rs. 3,190.*—The expenditure on this work was Rs. 82 against an allotment of Rs. 1,500. The short outlay was due to the site for the station-house not having been fixed by the Police authorities till after the close of the year.

124. The following buildings were repaired during the year :—

- (1) Terrace of record-room of Collector's Cutcherry at Masulipatam.
- (2) Press office and cook-room at Masulipatam.
- (3) Protestant cemetery at Masulipatam.
- (4) Eastern Division office at Bezvada.
- (5) Superintending Engineer's residence at Bezvada.
- (6) Bungalow on Orr's Hill at Bezvada.
- (7) Superintending Engineer's office at Bezvada.
- (8) Store buildings at Bezvada.
- (9) Vellatur rest-house.
- (10) Lame-shed at Bezvada.
- (11) Northern Sub-division office.
- (12) Cleaning out Orr's bungalow and nailing up doors.
- (13) Propping up terrace of rear verandah of Orr's bungalow.
- (14) Renewing the furniture of St. Mary's Church at Masulipatam.

125. **Gudivada.**—There was no grant assigned to this division under original works or repairs, but a sum of Rs. 23 was expended during the year on repairs to Gudivada Division office.

126. **Kistna (Western).**—Work on the Taluk Cutcherry at Sattenapalle was in progress. The expenditure will amount to Rs. 16,816 including adjustments to be made in supplemental accounts against an estimate of Rs. 21,889.

127. Improvement to the Taluk Cutcherry at Repalle was completed at a cost of Rs. 1,984 against an estimate of Rs. 1,845.

128. The provision of gallows for the District Jail at Guntur was in progress in the Bezvada workshops. The expenditure including adjustments to be made in supplemental accounts will amount to Rs. 385 against an estimate of Rs. 340.

129. Repairs to the Division office as well as Public Works Department hospital and Hospital Assistant's quarters at Duggirala were completed. The plantations in the Division office compound at Duggirala were maintained.

130. **Nellore.**—Sub-Registrar's office, Atmakur, was completed. The expenditure amounted to Rs. 3,191 against an estimate of Rs. 3,185. There are still some arrears on the work, which added to the outlay exceed the estimate. The excess was owing to additional work found necessary.

131. The work of converting the old Sub-Jail into a Town Police station was completed. The expenditure amounted to Rs. 2,527 against an estimate of Rs. 2,588.

132. **Collector's Office, Nellore.**—The superstructure up to floor level was completed. Terracing and flooring constructed and the walls of the upper story raised 8 feet. The progress of the work was impeded for want of girders and joists which arrived in December. The expenditure amounted to Rs. 28,443 against an estimate of Rs. 48,155.

133. The following minor works have been completed during the year :—

- (1) Sea Customs-house, Kistnapatam.
- (2) Improvements to Christ Church, Nellore.
- (3) Improving Public Works Workshops, Nellore.
- (4) Improving Collector's bungalow, Kistnapatam.

134. The following buildings were repaired during the year :—

- (1) Collector's bungalow, Nellore.
- (2) Nellore Division office.
- (3) Police Assistant Superintendent's bungalow, Ongole.
- (4) Hill bungalow, Ongole.
- (5) Sub-Collector's bungalow, Ongole.
- (6) Treasury room, Collector's Cutcherry, Nellore, repairing iron railings.
- (7) Imbedding iron safes in the Ongole, Kavalu, Kandukur, Atmakur and Gudur Taluk treasuries.

135. **Bellary.**—Residence for the Collector at Anantapur; estimate Rs. 34,246, grant for the year Rs. 9,757, outlay for the year Rs. 5,952, outlay up to date

Rs. 30,441. A little pointing, plastering, painting, terracing, roofing and brick-work remained to complete the work.

136. Alterations and additions to the Collector's cutcherry at Bellary; estimate Rs. 57,325, grant for the year Rs. 10,627, outlay for the year Rs. 10,326, outlay up to date Rs. 54,524. The two wings and towers were completed and occupied, the front portion of the old central building was demolished and rebuilt to the full height of the superstructure; only parapets, pointing and general finishing remained to be done at the end of the official year.

137. Police huts at Vanavole; estimate Rs. 2,928, grant for the year Rs. 1,359, outlay for the year Rs. 1,602, outlay up to date Rs. 3,171.

138. First-class Taluk office at Kudligi; estimate Rs. 23,871, grant for the year Rs. 10,774, outlay for the year Rs. 10,765, outlay up to date Rs. 14,650. The foundations were completed and the superstructure was raised to an average height of 8 feet over basement.

139. **Cuddapah.**—Collector's Cutcherry at Cuddapah; estimate Rs. 1,43,741, grant for the year Rs. 22,126, outlay for the year Rs. 23,066, outlay up to date Rs. 1,40,690. Completed.

140. Tahsildar's Cutcherry at Rajampet; estimate Rs. 24,838, grant for the year Rs. 9,142, outlay for the year Rs. 8,839, outlay up to date Rs. 23,535. Completed.

141. New Divisional office at Cuddapah; estimate Rs. 8,508, grant for the year Rs. 4,508, outlay for the year Rs. 4,520, outlay up to date Rs. 8,519. Completed.

142. Improvements to Christ Church at Cuddapah; estimate Rs. 3,176, grant for the year Rs. 706, outlay for the year Rs. 656, outlay up to date Rs. 3,126. Completed.

143. Taluk Cutcherry at Badvel; estimate Rs. 21,330, grant for the year Rs. 12,000, outlay for the year Rs. 12,015, outlay up to date Rs. 18,419. Not completed.

144. **Kurnool.**—Taluk Cutcherry at Nandyal; estimate Rs. 34,676, grant for the year Rs. 2,852, outlay for the year Rs. 2,864, outlay up to date Rs. 36,510. Completed.

145. Head Assistant Collector's Cutcherry at Nandyal; estimate Rs. 17,900, grant for the year Rs. 11,537, outlay for the year Rs. 11,593, outlay up to date Rs. 16,780. This building was completed with the exception of roadway which was in progress.

146. Residence for the Assistant Superintendent of Police at Nandyal; estimate Rs. 5,752, grant for the year Rs. 100, outlay for the year Rs. 459, outlay up to date Rs. 1,092. Wood-work, door-frames, &c., ready and partly paid for.

147. **Coimbatore.**—The following major works were completed :—

(1) Constructing a sub-jail at Mettupalayam; estimate Rs. 3,220, outlay during the year Rs. 95, outlay up to date Rs. 3,035.

(2) Constructing a Sub-Registrar's office at Kollegal; estimate Rs. 2,630, outlay during the year Rs. 88, outlay up to date Rs. 2,545.

(3) Additions to the Central Jail at Salem; estimate Rs. 6,340, outlay during the year Rs. 952, outlay up to date Rs. 5,579.

(4) Repairs and improvements to the Government Taluk School at Namakal; estimate Rs. 4,300, outlay during the year Rs. 1,426, outlay up to date Rs. 4,425.

(5) Iron rail gates, &c., supplied to the Central Jail, Salem; estimate Rs. 4,918, outlay Rs. 4,918.

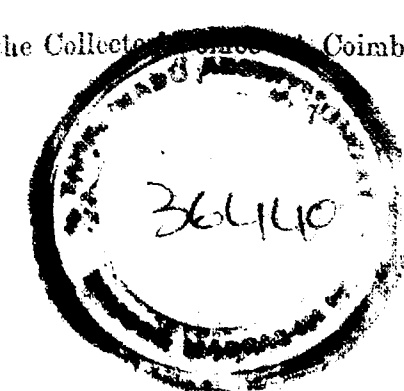
148. The following major works were in progress :—

(1) Constructing District Munsif's Court at Karur; estimate Rs. 17,420, outlay during the year Rs. 8,668, outlay up to date Rs. 15,053.

(2) Constructing a first-class Police station-house at Salem; estimate Rs. 2,556, outlay Rs. 1,760.

(3) Constructing a Sub-Registrar's office at Sular; estimate Rs. 2,750, outlay Rs. 1,016.

(4) Improving the Accounts branch of the Collector's Office at Coimbatore; estimate Rs. 15,849, outlay Rs. 4,620.



149. A sum of Rs. 3,751 was spent under minor original works against an allotment of Rs. 4,214.

150. The following works were completed during the year :—

- (1) Improving the District Forest office and constructing a store shed at Coimbatore; outlay Rs. 1,712.
- (2) Constructing a Sub-Registrar's office at Vaniyambadi; outlay Rs. 2,213.
- (3) Additions and alterations to the Huzur treasury at Salem; outlay Rs. 1,264.
- (4) Rebuilding servants' quarters and sinking a well in the compound of the Executive Engineer's bungalow at Dinur; outlay Rs. 140.

151. A sum of Rs. 4,106 was spent on repairs, the chief items being :—

- (1) Fixing lightning-conductor to the powder magazine attached to the Police Head-quarter office at Coimbatore; outlay Rs. 184.
- (2) Repairing the Deputy Tahsildar's cutcherry and out-houses at Vaniyambadi; outlay Rs. 1,517.
- (3) Repairs to the quarters of the Assistant Superintendent of Police, Tirupatūr; outlay Rs. 231.
- (4) Repairing Deputy Tahsildar's quarters at Yercaud; outlay Rs. 191.
- (5) Repairing the late division office building at Hastampatty; outlay Rs. 585.
- (6) Fixing iron-plates to cross rails of strong-room of sub-treasury at Hosūr; outlay Rs. 166.
- (7) Securing the treasury room at Krishnagiri; outlay Rs. 215.
- (8) Repairs to the Jail Superintendent's bungalow at Coimbatore.—Work executed by the Superintendent of Jail; outlay Rs. 478.

152. **Nilgiris.**—Rupees 8,230 were spent on additions and improvements to Government house at Ootacamund, the principal items of expenditure being furniture Rs. 1,700, married Bandsmen's quarters Rs. 6,390.

153. The following works were completed during the year :—

- (1) Improvements to peons' quarters on Mount Stuart; estimate Rs. 2,840, outlay during the year Rs. 583, outlay up to date Rs. 2,577.
- (2) Providing accommodation for the Sub-Judge's Court at Ootacamund; outlay Rs. 58,599 against an estimate of Rs. 59,585.
- (3) Repairs to Mount Stuart property at Ootacamund; outlay Rs. 20,959 against an estimate of Rs. 22,330.
- (4) Extending and improving the Police station and huts at Masnigudi; outlay Rs. 2,871 against an estimate of Rs. 3,020.

154. The outlay on minor works during the year was Rs. 8,374.

155. The following are the principal works completed :—

- (1) Providing record-shelves for Waterloo record-room, Ootacamund; outlay Rs. 1,599.
- (2) Altering the roof of the Revenue Department clerks' room and large record-room on Stonehouse Hill, Ootacamund; outlay Rs. 730.
- (3) Extending and improving the out-houses of St. Stephen's Church at Ootacamund; outlay Rs. 466.
- (4) Covering with Mangalore tiles the roof of All Saints' Church, Coonoor; outlay Rs. 1,396.
- (5) Improving the out-houses of Cinchona Villa; outlay Rs. 745.
- (6) Reflooring St. Thomas' Church, Ootacamund; outlay Rs. 762.
- (7) Improving the roof of the Protestant Church at Kōtagiri; outlay Rs. 912.

156. A sum of Rs. 18,718 was spent on repairs, the chief items being—

- (1) Repairing the Government House and all subsidiary buildings at Ootacamund; outlay Rs. 7,371.
- (2) Repairing the Government offices on Stonehouse Hill, Ootacamund; outlay Rs. 758.
- (3) Repairing the Deputy Tahsildar's Cutcherry and out-houses at Coonoor; outlay Rs. 1,944.
- (4) Repairs to the new road of approach to Government House at Ootacamund; outlay Rs. 700.
- (5) Repairs to Ottley Hall at Ootacamund; outlay Rs. 621.

157. **West Coast.**—The following works were completed and handed over for occupation :—

- (1) Police Hospital at Mangalore; outlay Rs. 11,892, estimate Rs. 11,745.
- (2) Deputy Collector's Cutcherry at Puthur; outlay Rs. 12,679, estimate Rs. 10,960.
- (3) Wire fencing around public offices, Ponāni; outlay Rs. 70,356, against an estimate of Rs. 74,521.
- (4) *Law Courts at Calicut.*—Gravelling the roads, erecting iron gates and lamp-post; cost Rs. 1,800. With these the Law Courts were fully completed and made over to the Judicial Department; total outlay Rs. 1,24,880, estimate Rs. 1,24,439.
- (5) Solitary and condemned cells in the District Jail at Calicut; outlay Rs. 9,764, estimate Rs. 9,280.
- (6) Sub-Judge's Court at Tellicherry; outlay Rs. 13,906, estimate Rs. 14,440.

158. The following works were in progress :—

- (1) *Sub-Registrar's office, Manjeshwar.*—Grant and outlay were Rs. 1,195.
- (2) *Police huts at Puthur.*—Grant and outlay were Rs. 3,067.
- (3) *Tahsildar's office at Coondapoor.*—Outlay Rs. 12,017, grant Rs. 10,000.
- (4) *Improvements to the second and third blocks of the Collector's Cutcherry, Mangalore.*—The full amount of the grant was spent, viz., Rs. 12,000.
- (5) *Improvements to the District Munsif's Court, Kāsaragōd.*—Outlay Rs. 3,710 against a grant of Rs. 3,629.
- (6) *Providing wooden ceiling to the District Munsif's Court at Udipi.*—Outlay Rs. 1,264, grant Rs. 1,266.
- (7) The work of protecting the walls of the record tower of the District Munsif's Court at Tellicherry was completed at a cost of Rs. 334.
- (8) *Constructing new Collector's Cutcherry at Calicut.*—Outlay during the year was Rs. 23,614 against a grant of Rs. 18,680; total outlay was Rs. 55,855 against an estimate of Rs. 1,89,970.
- (9) *Sub-Registrar's Office, Malapuram.*—Outlay Rs. 2,315 against an estimate of Rs. 2,785.
- (10) *Sub-Registrar's Office, Condotti.*—Outlay Rs. 1,543, estimate Rs. 3,020.
- (11) *Sub-Judge's and District Munsif's Court, Pālgat.*—Outlay Rs. 15,712, grant Rs. 15,000; total outlay Rs. 22,912 against an estimate of Rs. 28,790.
- (12) *District Munsif's Court, Chowghat.*—Rupees 2,500 were spent in collection of materials against a grant of Rs. 4,000.
- (13) Re-roofing the goods shed attached to the Sea Custom House, Calicut, was completed; accounts remaining to be closed.
- (14) *New Taluk Cutcherry at Mangalore.*—A sum of Rs. 5,000 was spent in collecting materials.

159. A sum of Rs. 9,159 was spent on repairs, the following being the principal works :—

- (1) Repairs to St. Thomas' Church, Quilon; estimate Rs. 1,847, outlay Rs. 1,737.
- (2) Repairs to roof of District Jail, Calicut; estimate Rs. 1,260, outlay Rs. 1,146.
- (3) Annual repairs to Executive Engineer's office, Calicut; estimate Rs. 475, outlay Rs. 468.
- (4) Annual repairs to St. John's Church at Cannanore; estimate Rs. 450, outlay Rs. 392.
- (5) Painting public offices at Ponāni; estimate Rs. 600, outlay Rs. 519.
- (6) Levelling the compound of District Munsif's Court at Puthur; estimate Rs. 650, outlay Rs. 536.

160. **Bangalore.**—Four minor new works were carried out at a cost of Rs. 1,427. Outlay on repair works was Rs. 3,384.

161. **North Arcot.**—No major new works were carried out during the year. An expenditure of Rs. 472 was, however, incurred in the acquisition of land required

for the construction of a Sub-Registrar's office at Kuppam and reconstruction of District Munsif's Court at Tirupati.

162. Six minor new works were in progress, of which three were completed. The year's expenditure was Rs. 3,637.

163. Twenty-seven repair works were in progress, of which twenty-four were completed. The year's outlay was Rs. 3,723.

164. **Chingleput.**—Additional accommodation and improvements to Teachers' College at Saidapet were completed on an estimate of Rs. 14,460 and handed over to the Educational Department. The total cost up to 31st March 1890 was Rs. 14,481.

165. An upper story to the laboratory of the Agricultural College was constructed, &c., and handed over to the Principal. The total outlay incurred was Rs. 11,303.

166. Construction of Sub-Registrar's office at Utramallur was put in hand during the year, and the outlay on it was Rs. 2,574 against an estimate of Rs. 2,800.

167. Eight minor new works were completed during the year at a total cost of Rs. 5,220, of which the following were the principal works:—

168. The construction of cubicals and of a verandah 106 feet to the Chingleput Reformatory School work-shed was completed at a total cost of Rs. 1,257.

169. A new well in Guindy Park Government House was sunk near the Octagon bungalow at a total cost of Rs. 1,257 on the estimate of Rs. 1,095.

170. Annual repairs were executed at an outlay of Rs. 7,189 to the buildings and roads at Government House, Guindy Park. Repairs were also executed to the Reformatory School barracks and hospital at Chingleput, to the Pulicat Church (an incomplete work of last year), to St. Thomas' Church at the Mount and to the cemeteries at the Mount, Poonamallee and Pallavaram. The total expenditure on repairs to civil buildings including Government House, Guindy, was Rs. 15,192.

171. **South Arcot.**—The new Munsif's Court at Chidambaram was built up to basement level. All the teakwood was purchased and brought to site. The outlay was Rs. 5,001 on the estimate of Rs. 11,155.

172. At the new Taluk office at Villupuram, concrete for lower steps for foundation was put in and brick work to within 2 feet of ground level built. Some timber was collected and frames for doors nearly ready; estimate Rs. 15,720, outlay Rs. 5,747.

173. The new treasury room for the Collector's Cutcherry at Manjakuppam was completed at a total cost of Rs. 5,671 against the estimate of Rs. 5,310 and the building handed over to the Revenue Department.

174. *Additions to the Collector's Cutcherry at Manjakuppam.*—Out of an allotment of Rs. 659, Rs. 604 were paid during the year in settlement of all demands to the contractor who carried out the work in 1887-88 on the estimate of Rs. 8,411.

175. Under Minor New Works, the new Police station at Kutteriput and iron record-racks for the District Court at Cuddalore, both incomplete works of the previous year, were completed and handed over to the departments concerned.

176. Shutters were provided to the iron-barred windows, &c., of the new treasury room, Collector's office, at a cost of Rs. 153 against the estimate Rs. 165.

177. The extension of the record-room of the Sub-Collector's office at Tindivanam was commenced on an estimate of Rs. 1,260 and Rs. 671 were spent. The year's outlay under this head was Rs. 1,901.

178. Repairs to the Collector's residence and to the barracks at Manjakuppam and a few other petty repairs were carried out to completion.

179. Repairs to the District Court, the Police Assistant Superintendent's bungalow at Tirukoilur and the Local Fund school-house at Kallakurichi were in progress.

180. In the Public Works Stores and Workshops, minor original works carried out during the year were—

Extension of the smithy (north shop), an incomplete work of 1888-89.

A new verandah shed at the south of the Mathematical Instrument shops for locating the carpenters of that department.

A shelter shed for repairing engine and boiler.

A new furnace for galvanizing iron chains.

A lean-to roof along the west side of the timber shed and causeways and small bridges, &c., were necessary to the invert surface drains formed in 1888-89, besides other petty works.

181. Under Repairs, repairs to the "Carpenters' shed" commenced in 1888-89 were completed, besides a few other petty repairs.

182. **Trichinopoly.**—The District Jail was completed at an outlay of Rs. 74,663, the expenditure in the year being Rs. 719; estimate Rs. 85,244.

183. Alterations and improvements to the Royal Artillery barracks at Trichinopoly, estimate Rs. 19,700, outlay during the year Rs. 6,989, and up to the year Rs. 8,526. For the renewal of the roof of the main building steel girders were brought to site; alterations to the several other parts were either finished or in progress, and materials were under collection. A supplemental estimate of Rs. 5,200 was submitted for sanction.

184. Construction of Police huts at Voithalay was more than half finished; estimate Rs. 1,300, outlay Rs. 1,038.

185. Renewing the flooring of the District Munsif's Court-house at Ariyalur was nearly finished; estimate Rs. 2,080, outlay Rs. 847.

186. Repairs to Christ Church, Trichinopoly, and to the Superintending and Executive Engineers' offices, and demolition of the dangerous portion of the Nabob's palace were carried out, and the well in the Central Jail was deepened at a cost of Rs. 1,865.

187. **Tanjore.**—Improvement to the District Press office at Tanjore was completed at a cost of Rs. 2,515 against the estimate and allotment of Rs. 2,920.

188. Rebuilding a portion of the Taluk Cutcherry at Kumbakonam for Sub-Collector's office was almost completed, the outlay during the year being Rs. 4,968 against the estimate of Rs. 4,862. About 200 rupees worth of work remained to be done. The excess was due to a mistake in the estimate.

189. Repairs to the Sub-Magistrate's Cutcherry at Porayar were in progress, the outlay being Rs. 1,012 against the estimate of Rs. 2,720.

190. *Improvement to the Taluk Cutcherry at Tanjore.*—Materials to the extent of Rs. 967 were collected in anticipation of sanction to the estimate.

191. Police Station-house at Vallam was completed at a cost of Rs. 2,463 against the estimate of Rs. 2,260, outlay during the year being Rs. 1,482.

192. The District Court-house at Tanjore was provided with record-racks at a cost of Rs. 504; improvement to the Sub-Registrar's office at Tiruvadamardur was completed at a cost of Rs. 1,514 against the estimate of Rs. 1,480; two sets of latrine for the Kumbakonam College were constructed at an outlay of Rs. 604; and wooden record-racks were provided to the Taluk Cutcherry at Mayavaram at a cost of Rs. 481.

193. Repairs to the Tanjore palace were partly carried out at an outlay of Rs. 4,349 against the estimate of Rs. 9,910. Repairs to the iron doors of cells in eight blocks in the District Jail at Tanjore, lightning-conductor to the District Court-house, Treasury office western room, Kumbakonam, District Munsif's Court-house, Mayavaram, and Tanjore division office were carried out, and repairs to the District Press office at Tanjore and Sea Customs office at Tranquebar were in progress, the total outlay being Rs. 3,100.

194. **Negapatam.**—The District Munsif's Court-house at Tiruvallur was fully completed at a total cost of Rs. 14,061, the outlay during the year being Rs. 1,169 against the estimate of Rs. 14,230.

195. Construction of a Sub-division office and Sub-division officer's quarters at Tiruturaiyandi; estimate Rs. 7,416, outlay Rs. 6,053. Building was nearly finished.

196. Improvements to the Sub-Jail, &c., in St. Joseph's College; estimate Rs. 3,093, outlay Rs. 3,195. Work was almost completed.

197. A compound wall to the Taluk Cutcherry at Patukóta was built at an outlay of Rs. 552, and the lightning-conductor attached to this building was improved at a cost of Rs. 152.

198. A sum of Rs. 1,395 was spent in repairing the Taluk Cutcherry, Sub-Court and Salt Assistant Commissioner's office in St. Joseph's College buildings, in repairing the Executive Engineer's quarters at Negapatam, Overseer's office and sub-division store-shed at Mannargudi, and in paying municipal taxes for these buildings.

199. **Madura.**—Constructing Sub-Magistrate's Cutcherry with Sub-Jail and out-houses at Shivaganga; estimate Rs. 12,570, outlay Rs. 3,500. Brick-work to the main building was built to the ground level, and greater part of woodwork was prepared and ready for fixing.

200. Constructing a court-room for the use of the Tahsildar of Madura; estimate Rs. 4,210, outlay Rs. 1,880. Walls built to height of 10 feet and most of the woodwork prepared.

201. Constructing a Taluk Cutcherry at Tirumangalam; estimate Rs. 23,114, outlay Rs. 9,491. Walls raised to different heights; materials for roofing collected and doors and window frames completed; iron doors under preparation.

202. Sub-Registrar's office at Sholvandán; estimate Rs. 2,570, outlay Rs. 475. Foundations dug and materials under collection.

203. Sub-Registrar's office at Nellore; estimate Rs. 2,770, outlay Rs. 450. Materials collected to the extent of the outlay.

204. District Munsif's Court-house at Paramagudi; estimate Rs. 13,693; outlay Rs. 8,850, of which Rs. 989 appertain to the year under reference. The whole outlay was incurred in the late Ramnad division, and the work already done was condemned, and it was decided by Government to construct the building on a different site. Nothing was done in the year except the fixing of a new site. Revised estimate was submitted for sanction through the District Judge. Of the outlay of Rs. 8,650, Rs. 4,318 only constitute loss.

205. *Sub-Registrar's office at Periyakulam.*—The addition of a room to this office was in progress on the estimate of Rs. 2,110, the outlay being Rs. 475; provision of windows to the Judge's record-room in Tirumalaik's palace was also in progress at an outlay of Rs. 431. The construction of a court-room and compound wall to the Deputy Tahsildar's cutcherry at Usilampatti was completed at an outlay of Rs. 2,524, of which Rs. 513 were spent in the year, the estimate being Rs. 2,420.

206. A sum of Rs. 2,827 was laid out in repairing roof of the District Jail, in demolishing the Police Superintendent's office, and in maintaining Tirumalaik's palace and garden at Madura, and in repairing Police Assistant Superintendent's bungalow at Ramnad and Deputy Tahsildar's office at Usilampatti.

207. **Tinnevely.**—Construction of Taluk Cutcherry with out-houses at Srivai-kuntham; estimate Rs. 25,940, outlay during the year Rs. 7,939, and up to the year Rs. 17,509; nearly completed.

208. The construction of a subsidiary jail to the Deputy Tahsildar's office at Kulasekharapatnam was completed at a cost of Rs. 3,837 against the estimate of Rs. 3,900, the outlay during the year being Rs. 1,109.

209. Sub-division and Overseer's office at Puthukudi was reconstructed at an expenditure of Rs. 2,447, of which the outlay during the year was Rs. 523, the estimate being Rs. 2,630.

210. Constructing a Sub-Registrar's office at Velathikulam; estimate Rs. 2,970, outlay Rs. 560. Concrete laid in foundation and materials under preparation.

211. Constructing Sub-Registrar's office at Alvár Tirunagari; estimate Rs. 3,900, expenditure during the year Rs. 998, total outlay Rs. 1,448. Road tunnel completed and concrete and brick foundation finished.

212. Constructing Sub-Registrar's office at Sivakasi; estimate Rs. 3,030, expenditure Rs. 500; materials collected.

213. Police Station-house at Masarapatti was completed at a total cost of Rs. 1,232, of which Rs. 473 were spent during the year, the estimate being Rs. 1,260.

214. The construction of a second-class Police station at Nángunéri was completed at an outlay of Rs. 1,789, of which Rs. 1,095 were spent during the year, against the estimate of Rs. 1,800.

215. English record-room to the Collector's office at Kokarakulam was repaired at a cost of Rs. 1,108, of which Rs. 746 were spent during the year, against the estimate of Rs. 1,145, and a latrine was reconstructed at a cost of Rs. 352.

216. To the District Jail at Palamcottah a solitary cell and a latrine were constructed at a cost of Rs. 1,131 against the estimate of Rs. 1,128; the drainage works were improved at an expenditure of Rs. 1,099 from the estimate of Rs. 1,295, and a verandah in front of block Nos. 4-B and 5-B was built at a cost of Rs. 2,050, the estimate being Rs. 2,050.

217. The compound wall of the Taluk Cutcherry at Nángunéri was reconstructed at an outlay of Rs. 1,529 out of the estimate of Rs. 1,540.

218. Travellers' Bungalow at Virudupati was partly repaired at an outlay of Rs. 1,000 from the estimate of Rs. 2,080.

219. A sum of Rs. 2,478 was spent in repairing Executive Engineer's office at Palamcottah, Sub-Collector's bungalow at Tuticorin, and Rs. 505 in repairing thirteen other works.

220. **Consulting Architect—Madras—Major Works.**—New Law Courts at Madras; total amount sanctioned Rs. 9,45,000, expenditure during 1889-90 Rs. 2,73,646, amount previously expended Rs. 1,78,513, balance remaining for expenditure Rs. 4,92,841.

221. New Court-house for the Presidency Magistrate; total amount sanctioned Rs. 49,880, expenditure during 1889-90 Rs. 3,413, amount previously expended Rs. 45,437. This work was fully completed.

222. Additions to the Medical College; total amount sanctioned Rs. 27,904, expenditure during 1889-90 Rs. 7,327, amount previously expended Rs. 18,103, savings effected Rs. 2,474. The verandah which was the only work remaining to be done was completed.

223. Improvements to the Examination Hall, Presidency College; total amount sanctioned Rs. 5,135, expenditure during 1889-90 Rs. 4,512, difference Rs. 623. Most of the work was finished with the exception of some glass windows.

224. Additions to the Lying-in Hospital, Madras; total amount sanctioned Rs. 39,299, expenditure during 1889-90 Rs. 15,583, to be expended Rs. 23,716.

225. Constructing an additional ward at the Ophthalmic Hospital for Native Military patients; total amount sanctioned Rs. 5,506, expenditure during 1889-90 Rs. 1,981 and amount previously expended Rs. 3,181, total Rs. 5,162, savings effected Rs. 344. This work was completed and handed over.

226. Additions to the Ophthalmic Hospital, Madras; total amount sanctioned Rs. 4,517, expenditure during 1889-90 Rs. 1,990 and amount previously expended Rs. 2,422, total Rs. 4,412, savings effected Rs. 105. This work which chiefly consisted in providing wooden ceilings to the roofs of the wards and providing a new kitchen for the Apothecary was completed.

227. Removing the old photographic room and constructing terrace roof of lower story, Madras Observatory; total amount sanctioned Rs. 2,772, expenditure during 1889-90 Rs. 2,293, amount to be expended Rs. 479. This work could not be completed last year. The large transit instrument had yet to be put in position by the Government Astronomer.

228. Quarters for second-class European attendants and quarters for Assistant Matron, Lunatic Asylum; total amount sanctioned Rs. 12,445, expenditure during 1889-90 Rs. 12,322, savings effected Rs. 123. These buildings were completed and occupied.

229. Constructing four cottages for isolating male and female patients, Lunatic Asylum; total amount sanctioned Rs. 8,080, expenditure during 1889-90 Rs. 1,742, difference to be spent Rs. 6,338. Walls built, roofs, doors and windows were being made.

230. Improving strong-rooms at the Paper Currency office, Fort St. George; total amount sanctioned Rs. 14,173, amount expended in 1889-90 Rs. 9,412, difference to be spent Rs. 4,758. Floors of all but two small vaults completed, ceilings were being strengthened.

231. Improvements to the cemetery of St. George's Cathedral; total amount sanctioned Rs. 3,674, expenditure during 1889-90 Rs. 1,212, difference to be spent Rs. 2,462. This work, which consisted of filling in the tank, extending the railing and providing gates for enlarging the cemetery, was almost completed.

232. Additions and improvements to the Training School for Mistresses; total amount sanctioned Rs. 26,370, expenditure already incurred Rs. 25,788, difference to be spent Rs. 582. Most of this work was completed, the sliding partitions, roads and gates remain to be done. Several additions and alterations were made during the progress of the work; a revised estimate was under preparation.

233. Additions and improvements to the Civil Orphan Asylum; total amount sanctioned Rs. 27,645. All the works sanctioned were completed except the stables, a portion of compound wall, and laying Red Hills water.

234. Constructing 12 stables for the Mounted Police at the Egmore Magistrates' Court; total amount sanctioned Rs. 4,228, expenditure during 1889-90 Rs. 968, difference to be spent Rs. 3,260. Materials for concrete and bricks collected, roof materials, doors and windows were being made.

235. New operating-room for the General Hospital; total amount sanctioned Rs. 11,590, amount expended Rs. 10,935, difference Rs. 655. This work was practically completed, some additional fittings, &c., remain to be done.

236. New Police station and Fire-engine shed in the grounds of Government House, Madras; total amount sanctioned Rs. 15,845, expenditure during 1889-90 Rs. 2,166, difference to be spent Rs. 13,679. Work commenced; a quantity of materials collected.

237. *Provincial Minor Original Works*.—Rupees 12,744 were expended on 72 different works under this head, the most important being in connection with additions and improvements to the Medical College, providing lightning-conductors to the Government Central Museum, fixing iron railings to the Model room of the College of Engineering.

238. *Provincial Repairs, Civil Buildings*.—Rupees 42,576 were expended under this head for the annual and general repairs to the buildings in charge of this division. Of this sum, Rs. 2,996-3-6 were for municipal taxes on certain Public Works buildings and Rs. 1,956 for the conservancy of the Floating and Senate House latrines.

IV.—PROVINCIAL—COMMUNICATIONS.

239. **Ganjam**.—The following works were executed during the year as famine relief works:—

	Estimate.
	RS.
(1) Ganjam-Gopalpur canal	3,38,423
(2) Strengthening the course of Boppayapuram gedda	3,500
(3) Constructing Tekkali-Anantagiri road	23,500
(4) Making a road from 8th to 18th mile of Battili-Hirmandalam road	10,980
(5) Constructing Kallikota and Boyarani road	8,300
(6) Constructing Ichápur-Jarada road	22,500

The apparent lapse of grant on the above works was due to the non-adjustment of normal expenditure on account of arrears in the accounts; when this is adjusted in the supplemental accounts for March, there will be little or no lapse.

240. **Vizagapatam**.—Completing road from Pottinghi to Koraput; estimate Rs. 2,79,230; the outlay to end of the current year was Rs. 1,85,591, the expenditure during the year was Rs. 48,689 against an allotment of Rs. 48,689. The road,

with the exception of short breaks and the approaches to the bridges, will be finished before the rains this year. Up to 1st April the following work was finished:—

	Miles.	Fur.
Total length of road	30	0
Metal collected	28	4
Earthwork done	28	0
Metal spread	26	4
Metal rammed	25	0
Gravel collected	22	2
Road open for traffic	21	0

All the tunnels and road dams were completed; Sepoyputty bridge built 1 foot above floor level; Pongar bridge, concrete in, for one abutment; Doliam, Gollagedda, Dumaruputty, Palachi, Duragadu and Gopamapilli bridges' foundations excavated to floor level; Koraput and Pottinghi nulla bridges completed and open for traffic.

241. New Pottinghi Ghât road; estimate Rs. 4,49,371, outlay to end of the current year was Rs. 4,58,988. The expenditure during the year was Rs. 4,726 against a grant of Rs. 4,000. The principal works on the road are, the construction of a girder bridge across the Sunki and a two arched bridge across the Rallagedda streams. The girders for the former were fixed on the abutments and piers, and the abutments and piers for the latter constructed. The following works were maintained at a cost of Rs. 9,636:—

- (1) Maintenance of Pottinghi Ghât road.
- (2) Maintenance of agency fair-weather road from Pottinghi to Koraput.

242. **Godavari (Eastern)**.—The navigation works at Dumagudem were maintained at a cost of Rs. 11,316 during the year. The stone bund placed across the ruined scouring sluices, Dumagudem, at a cost of Rs. 4,188, stood during the freshes. The canal was closed for repairs from 15th March to 15th June 1889. Nine hundred and eighty-eight boats passed through it during the year against 385 in the previous year.

243. **West Coast**.—*Calicut-Vayitri road*.—This road was maintained in good order and kept open for traffic during the year at a cost of Rs. 15,005, and a bandy-stand was made at Luckadi and another at Tallapaya.

244. The side drains of the Tánrachéri ghât were improved at a cost of Rs. 1,840.

245. A block of cooly lines at Tagarapadi was erected; expenditure Rs. 807.

246. *Improvements to Vayitri-Gudalur road*.—The current year's grant for the work was Rs. 1,05,000 and the expenditure was Rs. 1,05,737; total expenditure on the work was Rs. 1,73,552 against an estimate of Rs. 5,50,000. Up to 6th mile from Vayitri the road was surfaced and well finished. All earthwork up to end of Bolkaras (about 34 miles) new trace was completed, and a great deal of metal collected at Meppadi and Baderi (18 miles) to mango tree (30th mile). The Meppadi trace made fair progress. The Glenrock trace was completed and turned out a decided success, the gradient being reduced and the line shortened by two furlongs.

247. Materials consisting of broken and rough stone were collected at bridges 21, 34 and 45; also at Kerembetta bridge.

248. The Sholadi bridge was completed and opened for traffic.

249. *Repairs to Vayitri-Gudalur road*.—The road was repaired and cleared of jungle at a cost of Rs. 6,938 and kept passable for traffic.

250. A new toll-gate was provided at Vayitri, and a sum of Rs. 5,884 was spent on emergent repairs to the Sholadi mango tree section of the Vayitri-Gudalur road to keep the road open for traffic.

251. A sum of Rs. 11,653 was spent in renewing and maintaining road from Calicut to Vayitri and thence to Gudalur.

252. The main section of the line of communication which commences at Mettupalaiyam and joins the roads in Wynaad including the Coonoor and Gudalur ghât roads was maintained at a cost of Rs. 45,387.

253. **Nilgiris.**—The following works were in progress :—

(1) Metalling two miles of roadway to a width of 12 feet on the Ootacamund-Gudalur road between the 3rd and 5th mile; outlay Rs. 4,305.

(2) Constructing eight cart-stands on the road from Kullar to Ootacamund outlay Rs. 1,036.

254. Rupees 2,608 were spent on minor works against an allotment of Rs. 3,169 the chief items being—

(1) Widening roadway of Pykara bridge; outlay Rs. 541.

(2) Planting avenues on Ootacamund-Gudalur road; outlay Rs. 701.

(3) Constructing kitchens and drains for the toll-houses on the Coonoor-Kullar ghât road; outlay Rs. 333.

255. The following works were executed out of the grant for Repairs Communications and kept in thorough repair :—

(1) Remetalling five miles and two furlongs of the Coonoor ghât road from Barliyar to Benhope; expenditure during the year was Rs. 6,286.

(2) Repairing bridges on the Kullar-Coonoor section of the Kullar-Gudalur road; outlay during the year Rs. 736, outlay to end of year Rs. 7,970.

256. **South Arcot.**—Under Major Original Works, Communications, in South Arcot division, grants were given in the budget of Rs. 80,000 and Rs. 1,20,000 for construction of a masonry bridge across the Ponalar and of an iron girder bridge or masonry abutments and piers across the Gadilam in place of bridges which were destroyed in the floods of 1884. The grants were subsequently increased to Rs. 82,000 and Rs. 1,43,550 and the outlay during the year was Rs. 84,812 and Rs. 1,43,175 respectively.

257. All the iron work for the Gadilam bridge made and shipped by Messrs. James Goodwin and Co. of Motherwell, Glasgow, under the orders of the Secretary of State was landed at Cuddalore and conveniently stacked on the south side of the bridge. The progress on this bridge has been—

South abutment.—Wells built 18 feet and sunk 13 feet average; not yet hearted.

No. 1 *Pier.*—Wells built 20 feet, sunk 21 feet and hearted.

No. 2 *Pier.*—Wells built 19½ feet, sunk 20½ feet and hearted.

No. 3 *Pier.*—Wells built 19 feet, sunk 20 feet and hearted.

No. 4 *Pier.*—Wells built 20 feet, sunk 21½ feet and hearted.

No. 5 *Pier.*—Wells built 20 feet, sunk 21½ feet and hearted.

No. 6 *Pier.*—Wells built 28 feet, sunk 28½ feet and hearted.

No. 7 *Pier.*—Wells built 27 feet, sunk 27½ feet and hearted.

No. 8 *Pier.*—Wells built 23 feet, sunk 24 feet and hearted.

No. 9 *Pier.*—Wells built 22 feet, sunk 23 feet and hearted.

No. 10 *Pier.*—Wells built 22 feet, sunk 21½ feet and hearted.

No. 11 *Pier.*—Wells built 20 feet, sunk 20 feet and hearted.

No. 12 *Pier.*—Wells built 18½ feet, sunk 19½ feet and hearted.

North abutment.—Wells built 18 feet and sunk 16 feet average, and wells Nos. 1 and 5 hearted.

Retaining wall wells.—Up-stream 152, down-stream 152.

Rough stone flooring.—Second, 3rd, 4th, 5th, 6th, 9th and 10th bays completed.

Third and 4th piers built to girder level, 20 feet high; 5th, 4 feet high.

Iron Girders.—Girders for 3rd, 4th and 5th spans bolted together ready for rivetting and other rivetting (975 rivets in each girder) in progress.

258. On the Ponniar bridge, all wells were completely sunk and hearted except one small well in XI pier which was to go down 5 feet further. The laterite packing of the floors of 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th and half of 9th bay, two-thirds of 12th, the 13th, 14th, 15th and 16th bays was finished. The retaining walls to floors in 1st, 2nd, 3rd, 4th, 5th, 6th, 7th on south and from north abutment to 9th pier on west were built. Rectangular wells in one more bay, the 9th, were not sunk; all the remainder were finished. Piers 1, 2, 3, 4, 5, 6, 7, 12, 13, 14 and 15 finished.

North abutment raised to 10½ feet top of skew back and wings raised to 7 feet. South abutment and face walls raised to 10½ feet above springing, as also wing walls. Arches 1, 2, 3, 4 finished and centres struck without flaws, cracks, faults or irregularity in the masonry ring, 5th and ½ of 6th arches built and were still on the centering.

259. **Madura.**—Completion of the road from Cumbum to the foot of the Gudalur-Peermede ghât; estimate Rs. 90,507, outlay during the year Rs. 4,295, total expenditure Rs. 90,785. The road was completed.

V.—PROVINCIAL—MISCELLANEOUS PUBLIC IMPROVEMENTS.

260. **Godavari (Eastern).**—The roads and wells in Sappers' cantonment were repaired at a cost of Rs. 458 against the grant of Rs. 500.

261. **Buckingham Canal.**—Turving the Adyar training bank at west end was completed. The expenditure amounted to Rs. 163 against an estimate of Rs. 170.

262. **Kistna (Eastern).**—The repairs to the sea dyke at Masulipatam were carried out.

263. **Nilgiris.**—Fencing and improving the margin of Ootacamund lake; outlay during the year Rs. 242, outlay to end of the year Rs. 26,031.

264. A sum of Rs. 121 was spent on minor works against an allotment of Rs. 131. Rs. 389 were spent on repairs against an allotment of Rs. 384.

265. **West Coast.**—The only work under this head was rebuilding the ruined revetment wall opposite the public offices at Ponani to protect the foreshore; outlay Rs. 1,103, grant Rs. 1,015; work completed.

266. **Chingleput.**—Under Original Works, the artesian boring in the Kortalaiyar basin was continued and the boring carried down to a depth of 441 feet when it was stopped by order of Government. The total expenditure was Rs. 9,706 against the estimate of Rs. 8,745, the excess being due to the Government having decided on additional work.

267. **South Arcot.**—Under Repairs, a sum of Rs. 1,013 was spent on repairs of the Gadilam embankment to protect the town of Tirupuliyur from floods; estimate Rs. 1,160.

268. **Madura.**—*Rough trace from Kodaikanal to Pillar Rocks.*—A sum of Rs. 446 was spent towards cutting this trace from the estimate of Rs. 1,700.

269. **Tinnevely.**—Artesian well boring at Tuticorin; estimate Rs. 7,980, outlay Rs. 66, was incurred for landing charge, &c., of boring plant. No bill was received from Public Works Workshops at Madras for adjustment. The actual boring was not commenced, the estimate having been sanctioned, and the boring plant received only at the end of the year.

270. **Consulting Architect—Madras—Original Works—Major.**—Putting self-acting shutters to the Munro, Anderson and Commander-in-Chief's bridges on the Cooum and training the river; total amount sanctioned Rs. 39,360, expenditure during 1889-90 Rs. — 2 and amount previously expended Rs. 14,721, total Rs. 14,719, balance Rs. 24,641. This work was closed with the putting in of the shutters in three arches of the Anderson's and Commander-in-Chief's bridges. The shutters for all five arches for each of the three bridges were executed.

271. **Repairs.**—Rupees 9,611 were expended in maintaining Chepak Park, South Beach Marina, maintaining trees and grass-plots in the old fishing villages and conservancy of the Cooum river.

VI.—LOCAL—INCORPORATED.

272. **Rushikulya.**—The Aska and Surada road was maintained at a cost of Rs. 615 against a grant of Rs. 600.

273. **Godavari (Eastern).**—Aqueduct over Chollangy salt creek, Kovur-Munjair junction canal; estimate Rs. 6,560, outlay during the year Rs. 4,185. Materials were collected for the aqueduct and the canal was banded across above and below the site. The building work was commenced on the 20th February and by the close of the year the abutments were raised to springing line of arches. The ordinary repairs to the Kovur-Munjair canal were carried out at a cost of Rs. 3,160.

274. **Godavari (Central).**—The construction of an iron girder bridge over the Gunnaram canal at 33 miles near Mattam; estimate Rs. 5,000, outlay Rs. 5,378; nearly completed.

275. Constructing a culvert over Pallivella drain; estimate Rs. 780, outlay Rs. 252. Materials collected. A sum of Rs. 800 was adjusted during the year on account of contribution from Local Funds towards the construction of the following works:—

- (1) Widening roadway of Mallikapuram channel sluice.
- (2) Do. do. of sluice at 45 miles 4 chains, Gunnaram canal.
- (3) Do. do. of Yalankayalakodu channel sluice.
- (4) Do. do. of Antaravedi channel sluice.
- (5) Do. do. of Mori channel sluice.
- (6) Do. do. of Kobaritota channel sluice.

276. **Kistna (Western).**—Rupees 1,327 were spent against a grant of Rs. 1,325 for the annual maintenance of the river and canal banks used as roads by the public. The banks were kept in fair and trafficable order.

277. **Nellore.**—The Pennér ancient roadway was gravelled at a cost of Rs. 606 against a grant of Rs. 600.

278. **Coimbatore.**—Completing the Talavasal bridge in the Atūr taluk, Salem district; estimate Rs. 58,500, grant for the year Rs. 32,000, outlay during the year Rs. 31,609, outlay up to date Rs. 36,272.

279. The girders were only received from England in January and there was not sufficient time to cart them to site, a distance of 44 miles, for which a special trolley to carry four tons had to be constructed; hence the allotment could not be fully utilized.

280. **South Arcot.**—Under Repairs, the roads along Coleroon bank, Khan Sahib's canal, Goverapet channel bank, and Veeranam tank bank were repaired at an outlay of Rs. 4,818.

281. The abutment and the piers of the bridge over the Shatiatope anicut were built up to nearly full height. The outlay was Rs. 2,380 against the grant of Rs. 4,763.

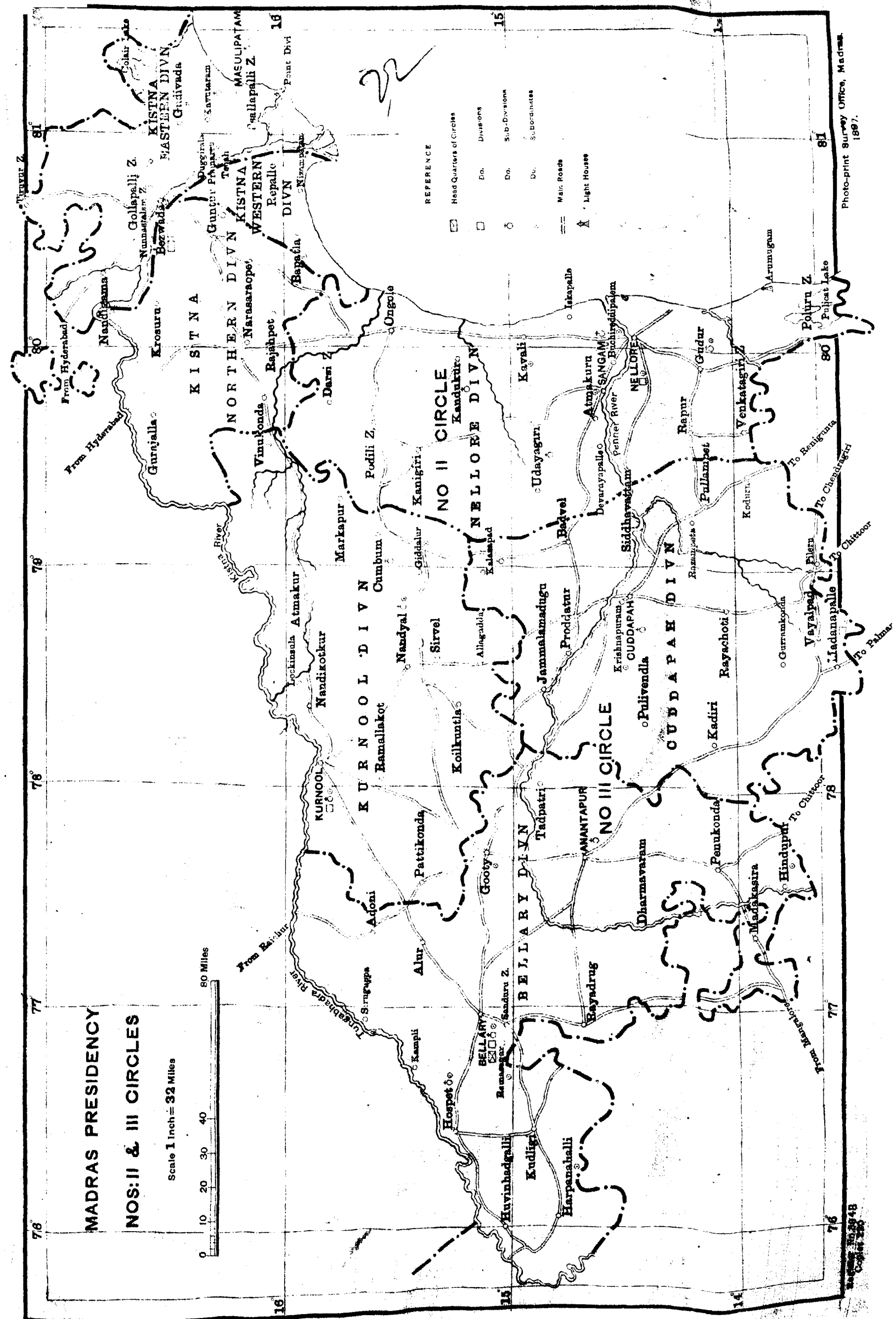
282. **Madura.**—Construction of a bridge across the Vaigai river at Madura; estimate Rs. 3,21,460, outlay during the year Rs. 13,064, total expenditure Rs. 2,76,777. Except some dressing to the coping of the parapet and pointing, this work was completed. The bridge was opened for traffic on the 6th December 1889.

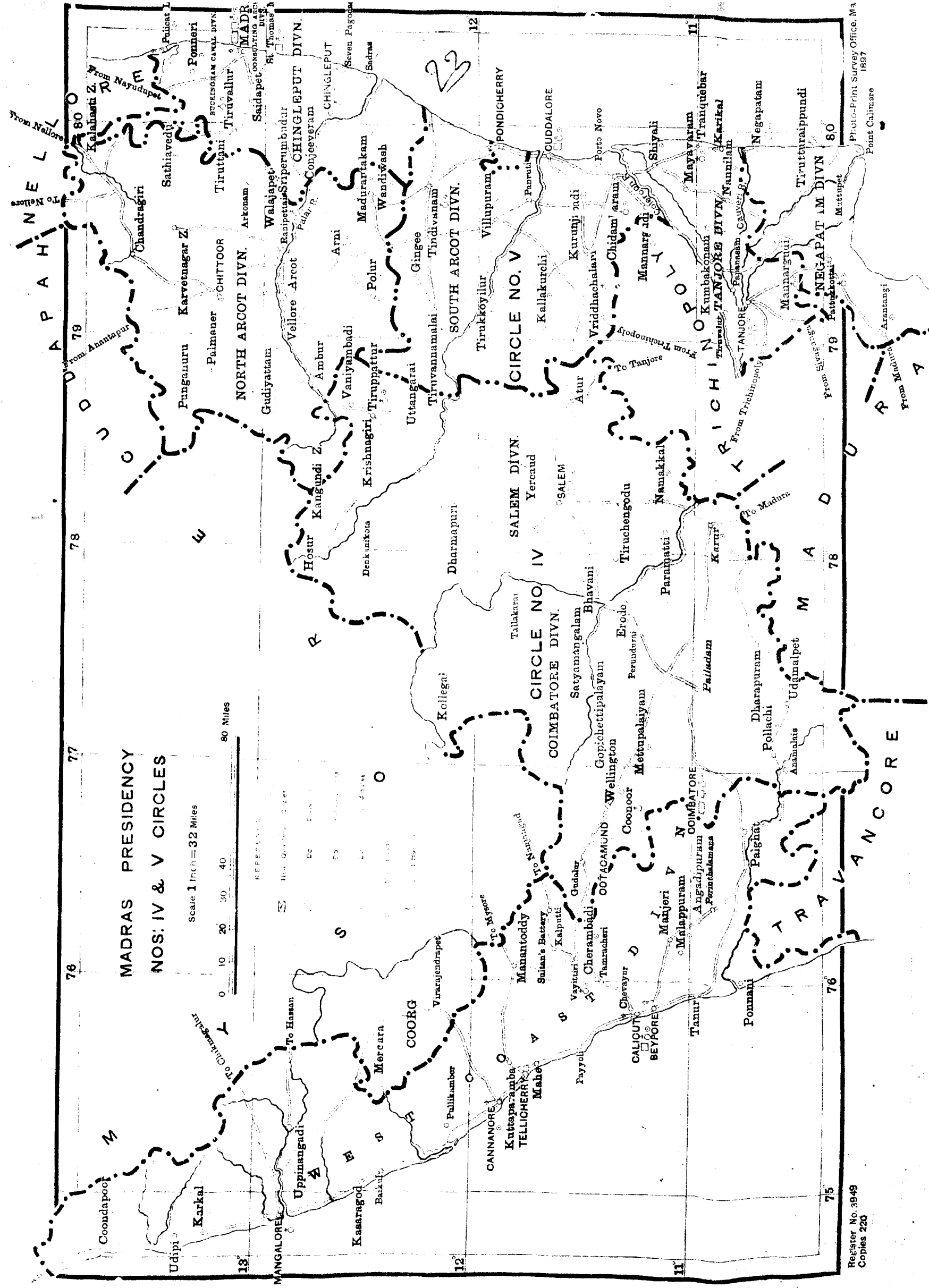
283. The Cumbum-Gudalur road, 10 miles, was repaired at an outlay of Rs. 1,496.

284. **Tinnevely.**—Raising Perunkulam surplus channel and road No. 23; estimate Rs. 7,805, Local Fund share Rs. 3,935, expenditure during the year Rs. 1,000, total expenditure Rs. 2,663. The portion of road from Perunkulam village to a distance of about 1,000 feet and that over channel bank up to Sirathanadanallur bridge were raised to the full height; about 3,000 feet of road remain to be raised, as also the graveling of the whole portions raised.

285. Pitching the eroded portions at $3\frac{1}{4}$ mile of the south main channel of Srivai-kuntham anicut system was completed at a cost of Rs. 910, of which the Local Fund share was Rs. 455. Puckle's channel was maintained at an outlay of Rs. 847, of which the Local share was Rs. 141, and Municipal share Rs. 282, the remainder being Government share.

286. **Tanjore.**—Rupees 754 were spent from Local Funds towards raising and widening portions of the Cauvery banks and Kodamurti right bank, and about 91 miles of roads passing over the river banks were maintained at a cost of Rs. 6,430.





MADRAS PRESIDENCY

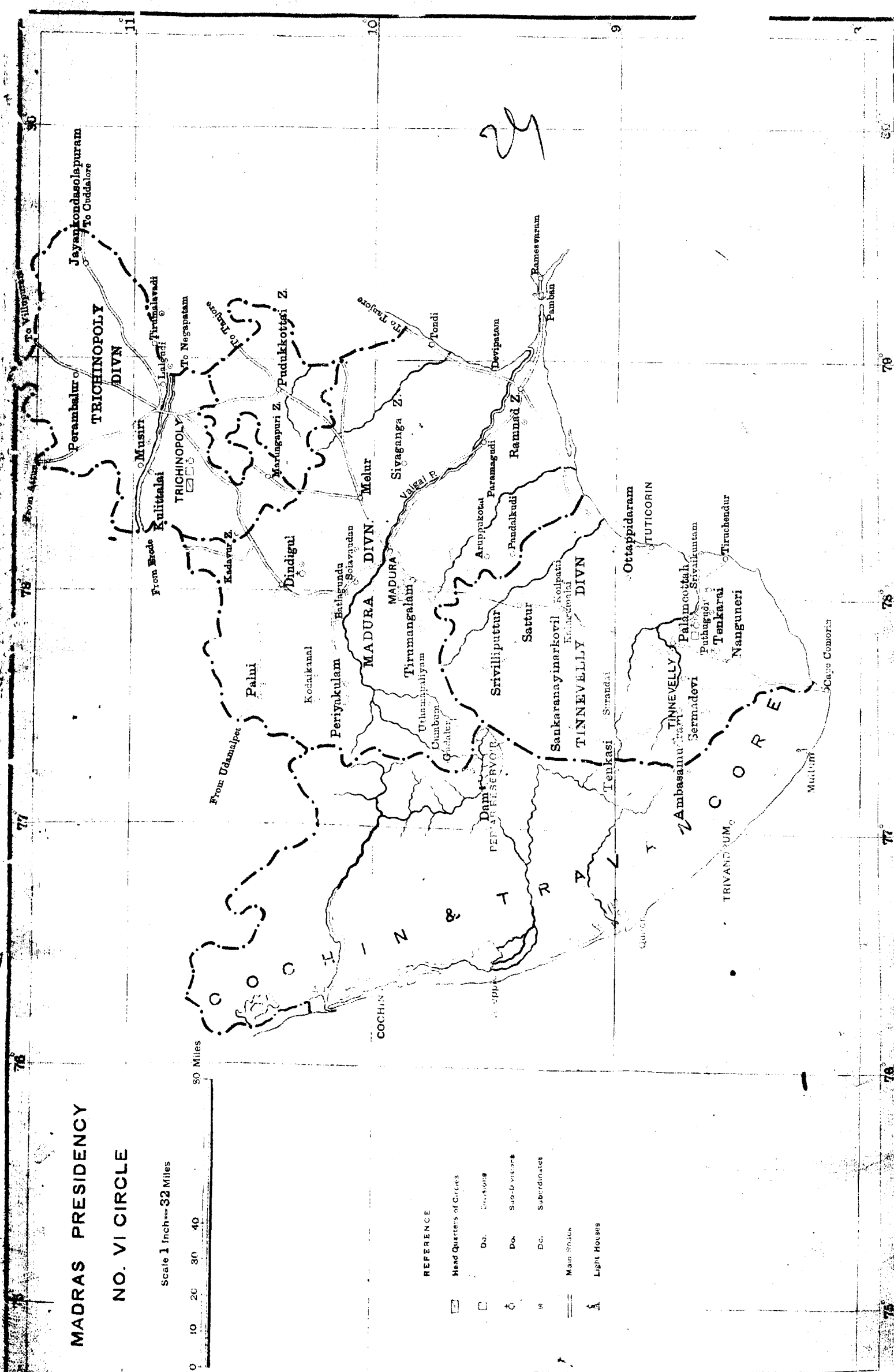
NO. VI CIRCLE

Scale 1 Inch = 32 Miles

0 10 20 30 40 50 Miles

REFERENCE

- ☐ Head Quarters of Circles
- ☐ Do. Districts
- ☐ Do. Sub-divisions
- ☐ Do. Sub-districts
- ☐ Main Roads
- ☐ Light Houses



ADRAS PRESIDENCY

No. VI CIRCLE

Scale 32 Miles = 1 Inch



REFERENCE

Metre Gauge Railways
Opened to Traffic

Main Roads

Canals

No. in Progress

Light Houses

01.2.11.13.89
390.1

